Meridian 1 and Succession Communication Server for Enterprise 1000

DPNSS1

Features and Services Guide

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About this document

This document applies to Meridian 1 Internet Enabled and Succession Communication Server for Enterprise (CSE) 1000 systems.

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

The DPNSS1 Features and Services Guide is part of the suite of Nortel Networks technical publications (NTPs) designed specifically for DPNSS1 applications.

This guide describes DPNSS1 features and defines the procedures to be followed when administering the overlay programs that are required for these features and other basic DPNSS1 capabilities.

Who should use this document

The intended audience of the DPNSS1 Administration Guide is network data administrators and technical personnel charged with administering DPNSS1 networks.

How this document is organized

The DPNSS1 Features and Services Guide has been arranged in a procedural format, providing information on how to configure basic DPNSS1 capabilities and features.

This document is broken down into the following sections:

- *Configuring basic DPNSS1 capabilities and features* - describes the configuration of basic DPNSS1 capabilities, such as defining DCHI, PRI loop number, and data blocks for a DPNSS1 link.

- *DPNSS1 features* - this section begins a series of chapters devoted to specific DPNSS1 features. Each feature contains a description and instructions for implementation.
- *Configuring an APNSS link* - describes the configuration of basic capabilities for an APNSS link
- *Traffic monitoring procedures* - provides a reference to the NTP that contains information pertaining to Traffic monitoring procedures

Configuring basic DPNSS1 capabilities and features

Contents

This section contains information on the following topics:

Reference list 9
Configuring basic DPNSS1 capabilities 10
Configuration note pertaining to port addressing modes 11
Implementation of basic DPNSS1 capabilities 14

Reference list

The following are the references in this section:

- *Traffic Measurement: Formats and Output* (553-2001-450)
- *Basic and Network Alternate Route Selection: Description* (553-2751-100)
- *ISDN PRI: Installation* (553-2901-201)
- *Networking Features and Services* (553-2901-301)
- *ISDN PRI: Maintenance* (553-2901-501)
- *System Installation Procedures* (553-3001-210)
- *Features and Services* (553-3001-306)
- *General Maintenance Information* (553-3001-500)
- *DASS: Product Overview Guide* (553-3911-100)
- *DASS: Installation Guide* (553-3911-200)

- *DASS: Features and Services Guide* (553-3911-300)
- *DASS: Maintenance Guide* (553-3911-500)
- *DPNSS1: Product Overview Guide* (553-3921-100)
- *DPNSS1: Installation Guide* (553-3921-200)
- *DPNSS1: Maintenance Guide* (553-3921-500)

This section contains the prompts and responses for each overlay program required to configure basic DPNSS1 capabilities. Configuration instructions are given for the following:

- Configuring the DPNSS1 DCHI and PRI loop number
- Setting the clock synchronization control
- Adding a DCHI card and the D-channel link
- Defining a customer
- Defining service routes, and defining the associated list of service trunks
- Enabling the DPNSS1 link
- Configuring DPNSS1 features

Configuring basic DPNSS1 capabilities

Follow the steps described in Table 1 on page 11 to configure basic DPNSS1 capabilities. The prompts and responses for these steps are explained in the overlays that follow. Responses in parentheses are default values.

> ***Note:*** Please note the difference in configuration requirements in LD 17 for DPNSS1 systems running on software up to and including Group G, and systems running on software up to and including Group H. Refer to the "Configuration note pertaining to port addressing modes" on page 11 which follows this table.

Table 1
Steps for configuring basic DPNSS1 capabilities

Step	Overlay	Action
1	LD 17 Configuration Record	**Group G** Configure DPNSS1 D-Channel port number for the NT5K35 DCHI, or the NT5K75 DCHI or NT6D11AE operating in standard mode. This is the number used to reference the D-Channel in Overlays 74 and 14; the value is entered against the **DCHI** prompt, and is in the range of 0-15. Configure PRI loop number **Group H** Configure the DPNSS1 D-Channel port number, which is a logical port number independent of the actual I/O port address. This is the number used to reference the D-Channel in Overlays 74 and 14; the value is entered against the **ADAN** prompt, and is in the range of 0-63. Configure PRI loop number
2	LD 73 Digital Data Block	Define clock synchronization control.
3	LD 74 DDSL Data Block	Define the data blocks used for the DPNSS1 protocols
4	LD 15 Customer Data Block	Define a DPNSS1 customer
5	LD 16 Route Data Block	Create the service routes to be used
6	LD 14 Trunk Data Block	Create the channels within the service routes
7	LD 75 IDA Trunk Maintenance	Bring the DPNSS1 link into service

Configuration note pertaining to port addressing modes

There is a distinction between Group G and Group H functionality regarding port addressing modes.

Group G and earlier

Standard address mode (0-15) can be any of the following:

- DPNSS1 (DDSL)

- DASS2 (DDSL)
- APNSS (LSSL)
- Q931 (DCHI)
- ISL (DCHI)
- SDI
- ESDI

Expanded address mode (0-159) can be either of the following:

- DPNSS1 (DDSL)
- DASS2 (DDSL)

The expanded mode addressing has no impact on the standard mode addressing, that is, DPNSS1 D-channel (DDSL) 7 in the expanded mode can exist with the Q931 D-channel (DCHI) 7 in the standard mode.

Theoretically, it is possible to have 160 DPNSS1 D-channels and 16 other I/O devices. In practise, however, there is a limit of 40 addresses in expanded mode and 16 in standard mode, for a total of 56 addresses.

The port address numbers assigned to the NT5K75 and NT6D11AE operating in expanded mode must not conflict with addresses assigned to other I/O port types. To avoid potential conflicts and to simplify system configuration, it is recommended that, in the expanded mode, the port addresses for the NT5K75 and NT6D11AE avoid the standard mode range (0-15) and be numbered in the range 16-159 instead.

Group H and later

Standard address mode (0-15) can be any of the following:

- DPNSS1 (DDSL)
- DASS2 (DDSL)
- APNSS (LSSL)
- Q931 (DCHI)
- ISL (DCHI)

- SDI
- ESDI

If the MSDL is used, standard mode can have a range of 0-63, and can be any of the following:

- Q931 (DCHI)
- ISL (DCHI)
- ESDI

Expanded address mode (0-159) can be either of the following:

- DPNSS1 (DDSL)
- DASS2 (DDSL)

The expanded mode addressing has no impact on the standard mode addressing, that is, DPNSS1 D-channel (DDSL) 7 in the expanded mode can exist with the Q931 D-channel (DCHI) 7 in the standard mode.

Theoretically, it is possible to have 64 addresses using the MSDL with Q931, ISDL, or ESDI, plus 160 addresses using the expanded mode for DPNSS1 for a total of 224 addresses. In practise, however, there is a limit of 64 addresses using MSDL with Q931, ISDL, or ESDI, plus 40 addresses using the expanded mode for DPNSS1, for a total of 104 addresses.

Presently, MSDL does not support SDI ports on DPNSS1 or APNSS, so the likely configuration would involve a mixture of standard mode addressing, MSDL addressing, and expanded mode addressing for DPNSS1. Such an example could be as follows:

0-7 (8 addresses) in the standard mode;

8-15 (32 addresses) in the MSDL mode;

16-55 (40 addresses) in the expanded mode.

The port address numbers assigned to the NT5K75 and NT6D11AE operating in expanded mode must not conflict with addresses assigned to other I/O port types. To avoid potential conflicts and to simplify system configuration, it is recommended that, in the expanded mode, the port addresses for the NT5K75 and NT6D11AE avoid the standard mode range (0-15) and be numbered in the range 16-159 instead.

Implementation of basic DPNSS1 capabilities

LD 17 – Configure the DPNSS1 DCHI and the DCHI port number.

Note: The prompts have been presented according to Group G and Group H requirements.

Up to and including Group G software, for the NT5K35 and for the NT5K75 and NT6D11AE operating in standard mode

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	CFN	Configuration data block
DPNS	YES	Allow next prompt
DCHI	0-15	The DPNSS1 D-Channel port number, for DCHIs operating in standard mode using an SDI port address. This number is used to reference the D-Channel in Overlay 74. This prompt is only given if DPNS is YES
.....		
PARM	YES	To allow changes to the system buffers
.....		
DTIB	35-1000	Size of IDA trunk input buffers for entire system (determined according to traffic) The system must be initialized to invoke changes to DTIB
DTOB	4-100	To define the number of IDA trunk output buffers per DCHI (determined according to traffic) The system must be initialized to invoke changes to DTOB
.....		
CEQU	YES	To allow changes to the Common Equipment parameters

.....		
DDCS	0-159	The PRI loop number for the new DPNSS1 link. Enter multiples separated with a space. PRI loop numbers may have to be even values if the adjacent loop on the network pack is programmed

If the NT5K75 or NT6D11AE DCHI is used in expanded mode, use the following prompts in LD 17.

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	CFN	Configuration data block
.....		
PARM	YES	To allow changes to the system buffers
.....		
DTIB	35-1000	To define the number of trunk input buffers for the entire system
DTOB	4-100	To define the number of trunk output buffers per DCHI
.....		
CEQU	YES	To allow changes to the Common Equipment parameters
.....		
DDCS	0-159	The PRI loop number for the new DPNSS1 link. Enter multiples separated with a space. PRI loop numbers may have to be even values if the adjacent loop on the network pack is programmed

Up to and including Group H software

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	CFN	Configuration data block
ADAN	0-63	The DPNSS1 D-Channel port number. This is a logical port number, independent of the hardware I/O addresses. This number is used to reference the D-Channel in Overlay 74.
CTYP	DCHI	Selects the card type as being DCHI
DNUM	0-15	The hardware I/O address of the DCHI. **The switches on the DCHI must be set to correspond to this address.**
DPNS	YES	Indicates that the DCHI is being used for DPNSS1
PARM	YES	To allow changes to the system buffers
.....		
DTIB	35-1000	Size of IDA trunk input buffers for entire system (determined according to traffic) The system must be initialized to invoke changes to DTIB
DTOB	4-100	To define the number of IDA trunk output buffers per DCHI (determined according to traffic) The system must be initialized to invoke changes to DTOB
.....		
CEQU	YES	To allow changes to the Common Equipment parameters
.....		
DDCS	0-159	The PRI loop number for the new DPNSS1 link. Enter multiples separated with a space. PRI loop numbers may have to be even values if the adjacent loop on the network pack is programmed

LD 73 – Define clock synchronization control.

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	PRI2	2.0 Mb/s PRI
FEAT	SYTI	Digital system timers
PREF CK0	0-159	The primary reference loop numbers for clock controller 0
PREF CK1	0-159	The primary reference loop numbers for clock controller 1
SREF CK0	0-159	The secondary reference loop numbers for clock controller 0
SREF CK1	0-159	The secondary reference loop numbers for clock controller 1
		Notes: LD 73 must be run to set values To remove a reference loop and return to free run, enter X To leave a reference loop unchanged, enter <cr> To enable synchronization, set the tracking in LD 60. To track on a primary or secondary reference clock, the command is: TRCKPCK(for Primary) SCK(for Secondary) FRUN(for Free-Run) The Clock Controller will be in free-run mode when enabled. It should stay in this mode for several minutes before being switched to tracking mode.

LD 74 – Define the data blocks used for the DPNSS1 protocols.

Prompt	Response	Description
REQ	NEW, CHG, OUT, PRT, END	Create new data base, modify existing data base, remove data block, print data block, terminate program activity
TYPE	DDSL	Digital Signaling Link
S2	(0)/1	DCHI switch setting
		If the NT5K35 is used, then set S2 to 0
		If the NT5K75 or NT6D11AE is used: set S2 to 0 for standard mode addressing set S2 to 1 for expanded mode addressing
DDSL		The D Channel port number, entered in LD 17
		Group G
	0-15	If 0 entered to S2 prompt
	16-159	If 1 entered to S2 prompt
		Group H
	0-63	If 0 entered to S2 prompt
	16-159	If 1 entered to S2 prompt
SIGL	DA	DPNSS1 digital signaling
DDCS	0-159	Loop number used for the PRI link
PRIV	YES	Private DPNSS1 link
SIDE	BNT	The BNT end of DPNSS1 link
CNTL	YES (NO)	YES = change DPNSS1 link parameters NO = use default parameters

ALRM	TBF PP MM CC FAE PP MM CC HER PP MM CC TSF PP MM CC AIS PP MM CC LOI PP MM CC DAI PP MM CC	Enter the desired persistence time (PP), monitor time (MM), and repeat count threshold (CC) for one of the seven types of alarms The alarm condition thresholds are shown in the table on the following page
CNTR	0- 255 (CRT) (TMT) (SCT)	Only prompted if CNTL=YES. Enter the desired threshold for one of the three counters in the range 0-254. If 255 is entered, the threshold is set to infinity. The defaults are: CRT (channel reset threshold) 120 TMT (test message threshold) 50 SCT (stop count threshold) 20

Table 2 on page 20 lists the alarm condition thresholds that pertain to the ALRM prompt in LD 74.

Table 2
Alarm condition thresholds for the ALRM prompt

Alarm Mnemonic	PP	MM	CC
TBF	0-15 secs (5)	0-24 hrs (0)	0-15 (1)
FAE	0-15 secs (2)	0-24 hrs (1)	0-15 (4)
HER	0-15 mins (1)	0-24 hrs (1)	0-15 (10)
TSF	0-15 secs (0)	0-24 hrs (0)	0-15 (0)
AIS	0-15 mins (1)	0-24 hrs (1)	0-15 (4)
LOI	0-15 secs (0)	0-24 hrs (0)	0-15 (0)
DAI	1-15 mins (1)	0-24 hrs (1)	0-15 (5)

LD 15 – Define a DPNSS1 customer.

Prompt	Response	Description
REQ:	NEW, CHG	
TYPE:	CDB NET	Customer Data Block Networking Data (Release 21 gate opener)
CUST	0-99	Customer number
....		
LSC	1-9999	Local Steering Code of one to four digits, if required in the Coordinated Dialing Plan (CDP).
....		

TIDM	(NO) YES	Enter YES if the Trunk Group reference number of a Trunk Identity is meaningful (as part of the CDP DN). Enter NO if the PBX reference number is to be displayed without the Trunk Group Reference Number.
DASC	1-4	Enter the access code that is to be placed on displays before OLIs and TLIs received from the DPNSS1 trunk Entering the attendant's DN will remove an existing value. The value defaults to nothing if <cr> is entered.

LD 16 – Create the service routes.

Prompt	Response	Description
REQ	NEW, CHG, OUT, PRT, END	Create new data base, modify existing data base, remove data block, print data block, terminate program activity
TYPE	RDB	Route Data Block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	IDA	The trunk type (DPNSS1)
SIGL	DPN	The route type (DPNSS1)
....		
ICOG	IAO ICT OGT	Defines the route as both incoming and outgoing Defines the route as incoming only Defines the route as outgoing only
....		
ACOD	xxxx	The four-digit network access code for direct access to the route Note that after the initial set up, the ACOD will only be used for testing purposes

LD 14 – Create the channels within the service routes.

Prompt	Response	Description
REQ	NEW, CHG, OUT, PRT, END	Create new data base, modify existing data base, remove data block, print data block, terminate program activity. NEW and OUT may be followed by the number of channels being initialized (1-30)
TYPE	RDC VDC	Real Digital Channel Virtual Digital Channel
TN	lll c	Terminal Number loop number (0-159) and channel number (1-15/17-31) for Real channel
		For DPNSS1, real and virtual channels use the same TN.
DDSL		The D Channel port number, entered in LD 17
		Group G
	0-15	If the NT5K35 DCHI is used, or if the NT5K75 or NT6D11AE DCHI is used and is set in normal mode
	16-159	If NT5K75 or NT6D11AE DCHI is set in expanded mode
		Group H
	0-63	If the NT5K35 DCHI is used, or if the NT5K75 or NT6D11AE DCHI is used and is set in normal mode
	16-159	If NT5K75 or NT6D11AE DCHI is set in expanded mode
SIGL	DPN	DPNSS1 channel
CUST	X	Customer number
....		
RTMB	XX YY	Route and member number

INC		Applies when creating members in data blocks
	(YES)	If YES, channel numbers will be associated with members starting at the TN, both channel and member numbers increasing
	NO	If NO, member numbers decrease as channel numbers increase
PRIO	(XHP) YLP	High priority on channel seizure Low priority on channel seizure The high/low priority must be different at each end.

Loop X Member Channel

Member	Channel
1	1
2	2
.	.
.	.
15	15
17	17
.	.
.	.
31	31

Loop Y Member Channel

Member	Channel
31	1
30	2
.	.
.	.
17	15
15	17
.	.
.	.
1	31

LD 75 – Bring the DPNSS1 link into service, using the IDA Trunk Maintenance program.

Note: The NT8D72BA PRI card is required to support EuroISDN applications, and should be set to 120 ohm impedance. For more information on NT8D72BA switch settings, see the *DPNSS1: Installation Guide* (553-3921-200).

Step	Action	Response
1	Enable all PRI loops: **ENL DDCS l**	 ENBL
2	Enable the DCHI: **ENL DDSL n**	 ENBL IDLE (DCHI enabled, but all channels are disabled)
3	Enable the D-Channels: **STRT n** Both ends of the link should be started within 5 minutes of each other.	 ENBL STARTING (the configured D Channels are being enabled) ENBL ACTIVE (the configured D Channels are enabled)

DPNSS1 Attendant Call Offer

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The DPNSS1 Attendant Call Offer feature allows attendant-extended calls routed over DPNSS1 to be camped-on to a remote busy extension. This Call Offer functionality is provided over a DPNSS1 network or over a DPNSS1 to ISDN gateway.

After being offered the camp-on, the destination party has the option of either accepting the offer, or not. During the camp-on offer, the destination party receives camp-on tone, heard over the conversation. The destination party accepts the call offer by clearing the established call (the offered call may not be accepted by simply placing the established call on hold). The destination party rejects the call offer by not answering it.

If the busy party goes on hook, allowing the offered call to ring the telephone, the recall timer for the call is reset to the value programmed for ringing calls. If the call remains unanswered when this timer expires, the offered call is recalled to the attendant queue. If the call is accepted, the originating party receives ringback until the destination party goes off hook to answer the call.

If the call is not accepted, the camp-on is recalled to the attendant after the camp-on timer times out. Timing for camp-on recall begins as soon as the attendant presses the Release key to extend the camp-on to the destination party. The destination party may still answer the camp-on as long as the call is still on the attendant console (that is, while the attendant is talking to the source). The attendant may clear the camp-on by releasing the destination.

Operating parameters

Timed Reminder Recall feature for DPNSS1 must be equipped.

Call Offer over DPNSS1 applies only to attendants with an established call on the source side. An attendant can then camp-on a call only if the destination station is on an established call.

An enquiry call cannot camp-on to a busy station without attendant intervention — the camp-on attempt is rejected. An enquiry call exists when two stations are established in a simple connection, and one station offers a call transfer to another station. The set making the call transfer places the other established station on hold before making the call transfer. If the busy station has Call Waiting Allowed Class of Service, the call offer will be presented to the busy station as a call waiting call.

Only one call at a time may be camped-on to a busy destination station.

Camping-on is possible to a telephone in a ringback or dialing state.

Calls cannot be camped-on to a busy destination station with Call Waiting Allowed Class of Service, or that is second degree busy.

During Night Service, any camped-on call is cancelled and recalled to the night DN or re-routed to an attendant at another node if NAS is configured and active.

If mixed ISDN/DPNSS1 route lists are programmed at a gateway node, an incoming call over an ISDN route that uses an outgoing DPNSS1 route for a first call without call offer, will use the same DPNSS1 route for a call offer.

Feature interactions

Camp-on

The destination receives camp-on tone if the destination set has Warning Tone Allowed Class of Service, and Camp-on Tone Allowed has been configured for the customer in Overlay 15 (the Customer Data Block).

Semi-Automatic Camp-on

Semi-Automatic Camp-on does not function over DPNSS1.

DPNSS1 Executive Intrusion Conversion

DPNSS1 Executive Intrusion Conversion is not supported on the Meridian 1.

The Flexible Orbit Prevention Timer *should be set* to a value of "0" in LD 15. A non-zero value may cause problems for DPNSS1 calls encountering call forwarding, since two consecutive calls would be initiated from the originating station to the terminating station – refer to the feature interaction description for DPNSS1 Diversion.

DPNSS1 Diversion

In the case of DPNSS1 Diversion, if a call encounters a station with Call Forward active, then a new call is initiated from the originating node to the call forward extension. The following situations are considered involving attendant-extended calls:

- An attendant extends a DPNSS1 call originating from a Meridian 1, and the call does not contain a request for call offer. If the destination has Divert Busy or Divert Immediate active, then a new call is initiated as a simple call.
- If the call contains a call offer request, a new call is initiated using the new address and containing a Call Offer String.
- An attendant extends a DPNSS1 call terminating at a Meridian 1, and the call does not contain a request for call offer. If the destination has Call Forward All Calls active, then the call is routed to the call forward extension. This also applies if the destination is busy, and active with Call Forward Busy.

- If the call contains a request for call offer and encounters a destination with Call Forward All Calls active, then the call is routed to the call forward extension. If the routing involves a DPNSS1 trunk, then the call will contain a Call Offer Supplementary Information String. If the call encounters a destination with Call Forward Busy active, the call is camped-on to the destination, if camp-on is allowed. If camp-on is *not* allowed, the call is routed to the call forward busy extension. If the routing involves a DPNSS1 trunk, then the call will contain a Call Offer Supplementary Information String.
- If an attendant-extended DPNSS1 call encounters Diversion Busy or Diversion Immediate at a Meridian 1 gateway node, then a new call is initiated from the gateway node to the diverted destination. If a request for call offer was contained in the original DPNSS1 call, it will also be contained in the new call. If a request for call offer was *not* contained in the original DPNSS1 call, and if the new destination is busy and camp-on is allowed on it, then the call offer request will be included in the new call.
- The displayed information normally provided by the Attendant First-Second Degree Busy Indication that indicates that a station on a far node is in first or second degree busy status, is *not* provided in an ISDN/DPNSS1 gateway scenario.
- The Slow Answer Recall Modification feature, upon recall to the attendant from the original camp-on destination, requires the attendant to dial the extension again to be able to extend and camp-on the call again.
- Integrated Services Access (ISA) Call Types are not supported over DPNSS1.
- DPNSS1 operation and features are not supported with Meridian Link.
- Where the Secrecy feature is concerned, DPNSS1 calls, while at the source of the attendant, are considered as internal calls, unless the destination is a trunk.

Feature packaging

DPNSS1 Attendant Call Offer requires DPNSS1 Network Services (DNWK) package 231.

Feature implementation

There are no specific implementation procedures for this feature.

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Attendant Timed Reminder Recall and Attendant Three Party Service

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This feature implements the portion of the DPNSS1 Three Party Service which relates to attendant console operation. It also extends the operation of the DPNSS1 Timed Reminder Recall feature to calls extended from Meridian 1 operator consoles over DPNSS1 links.

Timed Reminder Recall allows a call that is extended by an attendant over a DPNSS1 trunk, to be recalled to the attendant if not answered within a customer-defined period of time. The source and destination parties remain active in the call.

Three Party Service allows the source and destination set displays to be updated, after the extended call has been answered at the destination set.

The recall timing is implemented at the Meridian 1 attendant node in the form of the slow answer recall timer and the camp-on timer. When the attendant extends a call to a destination extension in the ringing or call waiting state, by pressing the RLS key, the slow answer timer is started. If the extended call is camped on to a busy destination set, the camp-on timer is started.

If the idle set answers the call extension or the busy set answers the call waiting, the slow answer timer is stopped and the attendant node becomes a standard transit node. Messaging is immediately sent to update, by the Three Party Service feature, the displays on the source and destination sets.

If the busy set becomes free to answer the camp-on, the camp-on timer is stopped, the set receives ringing and the slow answer timer is started. If the call is answered, the slow answer timer is stopped and the attendant node becomes a standard transit node. The displays on the source and destination sets are updated.

If the slow answer recall timer expires, the source is recalled to the attendant, with the destination party still ringing or busy (in the case of call waiting). The attendant may extend the call once more by pressing the Release key. This causes the slow answer timer to start again. If the camp-on timer expires, the source is recalled to the attendant. The attendant may extend the camp-on once more by pressing the Release key. This causes the camp-on timer to start again.

It may be that the attendant node is a gateway node. If a call on the source comes in over an ISDN trunk and is extended to the destination over a DPNSS1 trunk, then recall timing is done by the DPNSS1 Timed Reminder Recall feature. After the attendant extends the call and the destination answers, the recall timer is stopped. The controlling (attendant) node sends signaling to the destination node, to update the display of the destination set. The display on the source set is updated only if Network Call Redirection feature is equipped. If the recall timer expires before the destination answers the call, the source is recalled to the attendant with no messaging being sent over the ISDN link.

If the source comes in over a DPNSS1 link and is extended to the destination over an ISDN link, then the recall timing is done by the Network Attendant Service (NAS) feature. After the attendant extends the call and the destination answers, the recall timer is stopped. The controlling (attendant) node sends signaling to the source node, to update the display of the source set. The display on the destination set is not updated by NAS; it is updated only if Network Call Redirection feature is equipped, and the call has been extended after the destination party has answered. If the recall timer expires before the destination answers the call, the source is recalled to the attendant with no messaging being sent over the DPNSS1 link. If the attendant transfers the call

after it has been answered by the destination, the display of the source set is updated by Three Party Service signaling. The display of the destination set is updated if Network Call Redirection is equipped.

Operating parameters

The slow answer timer is used for calls extended to a set in the call waiting state.

Feature interactions

ACD

If a call is extended over a DPNSS1 link to an ACD set, the controlling node will time for a slow answer recall while the call is in the ACD queue at the destination node.

Attendant to Attendant calls

Recall timing is not performed for attendant-to-attendant calls.

Call waiting

For calls extended over a DPNSS1 link, the slow answer recall timer is used instead of the call waiting recall timer, since the Meridian 1 does not distinguish between a call extended to a set that is idle or in call waiting state.

DPNSS Call Redirection

To prevent recall timing from being done at the originating node if the timing is done at the controlling node, the EEM messages TRFD and RECON are not sent from the controlling node to other parties involved in the call (this inhibits the DPNSS1 Call Redirection feature).

DPNSS Loop Avoidance

The DPNSS1 Loop Avoidance string (LA) may be added to the Initial Service Request Message (ISRM) of an enquiry call.

DPNSS Route Optimization

The Attendant Three Party Service at a controlling Meridian 1 node initiates the signaling sequence that causes the DPNSS1 Route Optimization feature, equipped on the originating node, to optimize the route between the originating and destination parties.

ICI key

A Recall ICI key that has been defined in the customer data block lights up when DPNSS1 timed reminder recall occurs.

Night Service

If the recall occurs when the customer is in Night Service, then external calls are routed to the Night DN. Internal calls will remain in the queue, waiting for the called party to answer. This functionality applies to calls extended over ISDN and DPNSS1 trunks.

Permanently Held calls

If, while extending a call, the attendant presses the HOLD key before pressing the RLS key, the call is placed on permanent hold on the loop key. The call is subject to the Timed Recall feature.

Recall key

Pressing the Recall key on a set has no effect, if the set is connected to the attendant over a DPNSS1 trunk and is being timed for slow answer recall or camp-on recall.

Recall to the Same Attendant

If the Recall to the Same Attendant feature is configured for an attendant, slow answer recalls and camp-on recalls occur to the same attendant.

Secrecy

If the Secrecy feature is activated by the attendant, the source side of a call being extended by the attendant is excluded if the destination is a trunk. As applied to a DPNSS1 trunk, the Calling Line Category received from the trunk must be DEC, DASS2, PSTN, or MF5.

Slow Answer Modification

If the Slow Answer Modification feature is activated by the attendant, the destination party is dropped when the recall occurs to the attendant.

Semi-Automatic Camp-on

The Semi-Automatic Camp-on feature does not apply to calls extended over a DPNSS1 trunk.

Night Forward No Answer

If a call is routed during night service by the Network Attendant Service feature to a set over a DPNSS1 link, the Night Forward No Answer feature will not apply as the information indicating that the call has been answered cannot be sent.

Group Hunt/Group Hunt Queuing

DPNSS1 does not support either the Group Hunt or Group Hunt Queuing features.

Dialed Number Identification Service

Dialed Number Identification Service (DNIS) information (number and name) for redirected calls will be retained and available to the called party if the redirection terminates on the original node where the DNIS information is available.

Feature packaging

DPNSS1 Attendant Timed Reminder Recall and Attendant Three Party Service require DPNSS1 Network Services (DNWK) package 231.

Feature implementation

LD 15 – Define the recall attendant DN and recall timers.

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	CDB ATT	Customer Data Block Attendant Data (Release 21 gate opener)
CUST	0-99	Customer number
OPT	aaa	Options
ATDN	xxxx(xxx)	The attendant DN. Recalls occur to this DN, upon expiration of the recall timer. If the DNXP package is equipped, up to 7 digits are allowed, otherwise only 4 digits can be entered

....		
RTIM	0-(30)-378 0-(30)-510 0-(30)-510	Slow answer recall timer Camp-on recall timer Call waiting recall timer

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Call Back When Free and Call Back When Next Used

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The DPNSS1 Call Back When Free (CBWF) and Call Back When Next Used (CBWNU) feature allows a user, upon calling a station that and finding that station to be busy or receiving no reply from a station, or upon finding congestion off a PBX to the called station, to request an automatic call-back notification when the called party becomes free (if the party was busy), or having been used (if there was no reply), or when a path between the two parties can be found (the congestion has cleared up).

On Meridian 1 Proprietary telephones (excluding the M2317 and M3000 sets, which are not supported in the UK), activation of CBWF and CBWNU PNSS1 CBWF and CBWNU call back requests may be initiated by pressing a set-equipped Ring Again (RGA) key or dialing a Special Prefix Code (SPRE) + 1 on Meridian 1 proprietary telephones (excluding the M2317 and M3000 sets, which are not supported in the UK), or by dialing a Special Prefix Code (SPRE) + 1 on analog (500/2500 type) telephones.

After receiving a free notification, in the form of a burst of ring tone lasting for six ring cycles, the caller may ring the desired party by simply going off-hook. The call is made automatically.

Operating parameters

The following capabilities are not supported by the DPNSS1 CBWF and CBWNU feature:

- M2317 and M3000 telephone sets
- data call backs requests against data terminals
- call back requests to or from an attendant console, or from an ACD set
- call back requests from a conference call attempt
- call back requests from an enquiry call, for DPNSS1 Three Party Service
- CBWF call back requests against a set which is in maintenance busy state

DPNSS1 CBWF and CBWNU cannot be used to override access restrictions.

The Call Trace feature cannot be used to trace virtual calls used for DPNSS1 CBWF and CBWNU.

It will not be possible to pick-up a DPNSS1 CBWF notification.

DPNSS1 CBWF and CBWNU cannot be used in conjunction with the Hot Line and Enhanced Hotline features, which have their own form of call back.

An Analog (500/2500 type) telephone may have only one call back request active at a time. Meridian 1 Proprietary telephones may make as many call back requests as keys are available.

Subsequent call back requests from either an Analog (500/2500 type) telephone or Meridian 1 Proprietary telephone automatically cancel an existing call back request on a set.

The Last Number Redial feature cannot be used to repeat the Ring Again SPRE or FFC used to access a DPNSS1 CBWF and CBWNU request.

DPNSS1 supports a form of interworking for MF5 call back requests. This interworking is not supported with the DPNSS1 CBWF and CBWNU feature.

DPNSS1 CBWF and CBWNU requests may not be made following a call attempt over a DPNSS1 trunk configured as a private line.

Traffic measurements are not made for virtual channels. Therefore, the virtual calls made for DPNSS1 CBWF and CBWNU requests will not affect traffic measurements.

Blocking of the called party against new incoming calls in order to allow the calling party time to accept the free notification will not be supported by the DPNSS1 CBWF and CBWNU feature.

Feature interactions

Auto-Terminate trunks

DPNSS1 CBWF and CBWNU call back requests will work in conjunction with the auto-terminate feature if the digits dialed at the originating PBX can identify both a virtual and real route to the terminating party. Also, the Originating Line Identity (OLI) and Called Line Identity (CLI) of the calling and called party, respectively, must correspond to the digits to be dialed to reach the other party from a Foreign Exchange.

Call Detail Recording

No call detail recording is produced for DPNSS1 virtual calls, which means that the DPNSS1 CBWF and CBWNU Request, Free Notify, and Cancellation activities for virtual calls will not be recorded. Call set up will be recorded if the requesting party accepts the call.

Call Forward

When an incoming DPNSS1 CBWF and CBWNU request is received and the local Call Forward feature is active, the call back request will be registered against the DN to which the set has been call forwarded. If the call has been forwarded to a DN that is outside the DPNSS1 network, the call back request will not be invoked.

Call Forward No Answer

The Call Forward No Answer feature is the non-DPNSS1 version of the DPNSS1 Diversion On No Reply, and behaves as for the DPNSS1 case.

Call Transfer

A DPNSS1 CBWF notification cannot be call transferred while it is in the ringing state. It can, however, be transferred once it is in the established state.

Call Waiting

If there is an active call on an Analog (500/2500 type) telephone, the DPNSS1 CBWF notification will call wait on the set until it has finished with the active call. If there is a call waiting on an Analog (500/2500 type) telephone, the DPNSS1 CBWF notification will be presented after the call waiting has been answered. If another call is presented to the set as a call waiting while CBWF notification is call waiting on the set, the waiting call will take precedence over the call back notification.

Daily Routines

At the scheduled time for daily routines, all DPNSS1 CBWNU requests will be cancelled at the called party's exchange.

Digit Display

As for local Ring Again, the display associated with RGA key associated with a DPNSS1 CBWF and CBWNU request will comprise of the Called Line Identity (CLI) of the called party plus any Insert Digits (INST) for the incoming route.

Directed Call Pick-Up

It will not be possible to pick-up a DPNSS1 CBWF notification.

Do Not Disturb

Sets with the Do Not Disturb (DND) feature active may make call back requests against other sets. The incoming free notification will override the DND state.

Call back requests may be made against sets that have DND active, but will not be presented to the set until DND has been deactivated.

DPNSS1 Diversion Immediate

Since DPNSS1 Diversion is not supported at a terminating exchange, incoming CBWF requests at a terminating exchange encountering Diversion will be rejected.

DPNSS1 Diversion On Busy

Incoming CBWF requests at a terminating exchange encountering Diversion On Busy will override it, with the request being presented at the called extension.

DPNSS1 Diversion On No Reply

Incoming CBWF requests at a terminating exchange encountering Diversion On No Reply will override it, with the request being presented at the called extension.

Feature Peg

DPNSS1 CBWF and CBWNU requests will be recorded against the Ring Again feature peg, if configured to do so.

Hunting and Group Hunting

An incoming CBWF free notification will not call hunt.

Initialise

If a system initialise occurs at an exchange, all of the call back requests will be deleted.

Insert Digits (INST) prompt

The INST prompt in Overlay 16 allows digits to be inserted as leading digits for all incoming DPNSS1 calls on an Integrated Digital Access route. To form the Destination Address (DA) for free notify, cancellation, and call set-up messages, the INST digits and the received Originating Line Identity (OLI)/ Called Line Identity (CLI) will be used to route the call for these messages.

Make Set Busy

Sets with the Make Set Busy (MSB) feature active may make call back requests against other sets. The incoming free notification will override the MSB state.

Call back requests may be made against sets that have MSB active, but will not be presented to the set until MSB has been deactivated.

Manual Line Service

Manual Line Service (MNL) sets cannot make call back requests, but call back requests may be made against MNL sets.

Multiple Appearance Directory Numbers

DPNSS1 CBWF and CBWNU requests may be made from and against a Multiple Appearance Directory Number (MADN).

Network Congestion

DPNSS1 CBWF requests may be made when network congestion is encountered, provided that dialling had been completed before busy indication was returned to the user.

Numbering Plan

A consistent DPNSS1 numbering plan is essential for the correct operation of the DPNSS1 CBWF and CBWNU feature.

Permanent Hold

An Analog (500/2500 type) telephone with a call on Permanent Hold may not invoke RGA.

Pretranslation

Pretranslation may be used with DPNSS1 CBWF and CBWNU requests.

Trunk Group Busy

DPNSS1 CBWF and CBWNU call back free notifications cannot override Trunk Group Busy (TGB). This also applies to the trunk set-up for the trunk reservation.

Feature packaging

The DPNSS1 CBWF and CBWNU feature requires the following packages:

- Digital Private Networking Services No.1 (DPNSS1) package 123
- Optional Features (OPTF) package 1 is required for the Ring Again component of Call Back When Free
- Basic Call Processing (BASIC) package 0 is required for Call Back When Next Used
- Integrated Digital Access (IDA) package 122
- Supplementary Services (SUPP) package 131

Feature implementation

LD 15 – Define the special prefix code (SPRE) to be able to activate Ring Again.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	FTR	Customer features and options
CUST	xx	Customer number
...		
- SPRE	xxxx	Special Prefix number for this customer
...		

LD 57 – Define the Flexible Feature Codes (FFCs) RGA from a an analog (500/2500 type) telephone. The FFCs may also be used on Meridian 1 proprietary telephone sets.

Prompt	Response	Description
REQ	NEW, CHG	New, or change
TYPE	FFC	Flexible Feature Code
CUST	xx	Customer number
FFCT	(NO) YES	Flexible Feature Confirmation tone
CODE	mmmm	Specific FFC type
...		
- RGA	RGA xxxx	Ring Again code Enter the Flexible Feature Code
...		

LD 11 – Add/Change a Ring Again Key on Meridian 1 proprietary telephones.

Prompt	Response	Description
REQ:	NEW, CHG	New, or change
TYPE:	xxxx	Telephone type where: aaaa = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, or 2616
TN	l s c u	Terminal Number
	c u	For Option 11C
KEY	xx RGA	Key assignment for Ring Again

LD 15 – Enable Ring Again On No Answer for Call Back When Next Used.

Prompt	Response	Description
REQ:	CHG	Change.
TYPE:	FTR	Features and options.
CUST	xx	Customer number.
- OPT	RNA	Enable Ring Again On No Answer.
...		

LD 16 – Configure the Network Ring Again timer over IDA routes.

Prompt	Response	Description
REQ	NEW	New.
TYPE	RDB	Route data block.
CUST	xx	Customer Number associated with route.
...		

TKTP	IDA	Integrated Digital Access route.
...		
CNTL	YES	To display the TIMR prompt.
...		
TIMR	NRAG (30)-240	Network Ring Again Timer for IDA routes.
...		

Feature operation

To activate DPNSS1 CBWF and CBWNU call back requests, follow these procedures.

Meridian 1 Proprietary Set (except the M2317 and M3000)

1 Press RGA key, or dial SPRE + 1 or RGA FFC.

2 Wait for confirmation tone, and then hang up.

When the busy party becomes free or a clear path has been found, your set will receive a burst of ring tone lasting six ring cycles.

3 To place a call to the other party, simply go off hook, and the party's extension will be rung.

Analog (500/2500) type telephones

1 Dial SPRE + 1 or RGA FFC.

2 Wait for confirmation tone, and then hang up.

When the busy party becomes free or a clear path has been found, your set will receive a burst of ring tone lasting six ring cycles.

3 To place a call to the other party, simply go off hook, and the party's extension will be rung.

Customer Controlled Routing with Digital Private Network Signaling System

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Previously, the Customer Controlled Routing (CCR) application did not apply to Digital Access Signaling System (DASS) or Digital Private Network Signaling System (DPNSS) trunks; therefore, if a call was made to a Control DN (CDN) from a DASS/DPNSS trunk it would be rejected.

The CCR with DPNSS feature enables incoming calls to a CDN over DASS/DPNSS trunks to be controlled by the CCR application script.

Operating parameters

DPNSS signaling will support CCR in the same manner as it is supported by ISDN trunks. DASS signaling will support CCR in the same manner as it is supported by CO (non ISDN)/DID trunks, except when Force Busy is the first treatment (busy tone will be provided to DASS instead of the default treatment provided by the CO/DID trunk).

DPNSS Signaling Timers

For DPNSS trunks, a timer is set on the originating switch on a route basis (from 128 to 32640 ms) that will clear the call if it times-out. This timer will time-out if no message is received in acknowledgment after sending out a message on the link. Therefore, calls may be cleared by the originating side of any transit DPNSS link.

The CCR timer has a value of from four to six seconds. If the CCR application fails to respond to an incoming call within the six-second time frame, the call will be given default treatment by the switch.

When configuring a network attention must be paid to setting the DPNSS route timers on transit nodes, because these timers may cause the clearing of some calls. A 10-second value for DPNSS trunks is recommended so that even if the CCR application cannot respond with in the CCR timer, the call can still receive default treatment, instead of being cleared (abandoned).

Networking

If the CDN is not on the terminating node of the DASS trunk but the call goes through a DASS/DPNSS or DASS/ISDN gateway, in cases such as unanswered calls receiving second or third treatment, tones are provided to the transit node, but not to the Public Exchange because of DASS operation specifications. An example is when it is desired to provide tones (e.g., silence, ringback, or busy) to an unanswered DASS call where the CDN is reached through a DPNSS or ISDN trunk. In this situation, the tone will not reach the Public Exchange and therefore the originator of the call. The originator does not receive the tone that is sent; instead the previous treatment continues.

One potential result from this operation of when the CCR sends a tone, and waits for the originator to clear the call, is that the originator may be listening to ringback, but in fact should be hearing a busy tone.

A user may also receive different handling of the call than desired, depending on the routing of the call. For example, the CDN may be reached directly through DASS, or directly through an ISDN Central Office, through a transit node with DASS/DPNSS, or through a DASS/ISDN gateway. Call handling might vary depending on which one of these paths the call traversed.

The following hardware is required to operate this feature: QPC775 Clock Controllers; QPC414 network card; NT8D72AA PRI2 pack, and NT5K75AA DCH card.

Feature interactions

Calling Line Identification (CLID)

Most of the time DPNSS provides Originating Line Identities (OLIs). DASS may provide this information, but it is not required. OLI, similar to CLID, identifies the calling party number when a switch terminates an incoming call. If OLI is not provided, the Trunk Access Code/Trunk Member Number are passed in the enhanced Application Module Link (AML) messages.

Although the maximum number of digits provided by the DASS/DPNSS OLI is 24, only the last 16 are passed as identification of the caller in the enhanced AML messages.

DPSNSS Supplementary Services

All DPNSS Supplementary Services might not be triggered for all CCR treatments. Supplementary Services might not work with certain CCR treatments because:

messages (NAM/CAM or CCM) can be sent without the corresponding action as expected by the Supplementary Services, or

some busy or overflow situations are indicated only by tones and not with the corresponding signaling.

Route Optimization, Call Offer, Redirection, Timed Reminder Recall, and Three-party Service are supported for CCR calls.

Call Back When Free, Call Back When Next Used, Loop Avoidance, and Step Back on Congestion are not supported for CCR calls.

Gateways

The gateway interaction can only occur when the CCR “Route to” command is used to route a call to another destination over another trunk. For incoming calls on DASS/DPNSS, “Route to” over trunks for which no gateway already exists is not supported.

If a gateway already exists with another type of trunk, there is no interaction if the command "Route to" is used as a first treatment. Interactions may occur if it is used as a second or later treatment.

Incoming DASS/DPNSS Calls Routed over ISDN with the Existing DASS/DPNSS – ISDN Gateway

The current gateway triggers DASS/DPNSS signaling messages related to the ISDN signaling messages received. If the command "Route to" is used as a first treatment, these messages are provided (i.e., NIM, CAM/NAM, CCM, CRM) as usual, without any interaction. The called/calling party is displayed correctly at the originator and destination sides.

With the existing gateway, interactions may only occur if "Route to" is used as a second or later treatment in the following situations:

- on incoming DASS/DPNSS calls that are routed over ISDN then an analog network, and
- on incoming DASS/DPNSS calls that are routed over ISDN to a destination that is busy.

In these situations, there is a chance that the displays will not be updated when the final destination answers the call (especially when the call has been already answered via a previous CCR treatment).

Interactions may result because a DPNSS NIM message can be sent if an ISDN PROGRESS message is received, a DASS/DPNSS CRM can be sent if an ISDN DISCONNECT message is received, or a DASS/DPNSS CRM can be sent if an ISDN FACILITY message is received.

The other signaling messages (NAM/CAM and CCM) do not interact (e.g., they are not sent if not allowed).

Incoming DASS/DPNSS Call Routed over DPNSS

If the command "Route to" is used as a first treatment, the messages are provided (NIM, CAM/NAM, CCM, CRM) as usual without any interaction when the call has been routed directly from DASS/DPNSS to DASS/DPNSS. The called/calling party will be displayed correctly on both the originator and destination sides.

Interactions only occur if “Route to” is used as a second or later treatment on incoming DASS/DPNSS calls that are routed over DPNSS to a busy or invalid destination (any state generating a disconnection resulting in a CRM message that is not consistent with the previous ringing or established call state due to CCR). There is a chance that the displays will not be updated when the final destination answers the call (especially when the call has been already answered via a previous CCR treatment).

Incoming DASS/DPNSS Call Routed over Analog or DTI2 Trunks

If the command “Route to” is used as a first treatment to route a DASS/DPNSS call over these trunks, there is no interaction. The call should evolve as it had been routed directly over analog or DTI2 trunks.

If “Route to” is a second or later treatment, there is no interaction if the termination is idle and the call is answered by the destination (no CCM message will be returned if it was already returned due to a previous CCR treatment).

If the call over the analog or DTI2 trunk cannot terminate (e.g., invalid DN, busy DN or congestion) a potential interaction is that a CRM can be sent with a clearing cause incompatible with the current state of the call (ringing or established) due to previous CCR treatments.

Incoming ISDN Call Routed over DPNSS with the Existing ISDN – DASS/DPNSS gateway

The current gateway triggers ISDN signaling messages related to the DASS/DPNSS signaling messages received. With the existing gateway interactions should only occur if “Route to” is used as a second or later command in the following situations:

- an incoming ISDN call is routed over DASS/DPNSS to an idle set, if the call is in the unanswered state
- the call is routed over DASS/DPNSS and analog trunks or any non IDA trunk, and
- the call is routed over DASS/DPNSS to a destination busy (i.e., any state generating disconnection or a facility message that is not consistent with the previous ringing or established state of the call due to CCR).

There is a chance that the displays will not be updated when the final destination answers the call if a second or later treatment has been used (especially when the call has been already answered via a previous CCR treatment).

If “Route to” is used as a second or later treatment (an ALERT or ALERT + CONNECT has already been sent by the CCR previous treatment), there are potential interactions in the following situations:

- an ALERT message is sent when an NAM/CAM message is received, if the call is not yet established (e.g., only an ALERT has been already returned because of previous CCR treatments)
- a PROGRESS message is sent when an NAM/CAM or NIM message is received
- a DISCONNECT message is sent when a CRM message is received (an interaction may occur if the reason for disconnection passed is not consistent with the previous state of the call due to CCR), and
- a FACILITY message is returned because of a CRM received (related to busy state with camp-on).

The answer should not trigger additional CONNECT messages and consequently should not trigger interactions.

Feature packaging

There is no new software package for this feature; however, the following packages are required for DASS/DPNSS signaling:

- Integrated Digital Access (IDA) package 122
- 2 Mbit Primary Rate Access (PRI2) package 154
- Digital Private Network Signaling System 1 (DPN) package 123 for DPNSS or Digital Access Signaling System 2 (DAS) for DASS.

Feature implementation

There are no specific implementation procedures for this feature.

Feature operation

No specific operating procedures are required to use this feature.

DASS2/DPNSS1 INIT Call Cut Off

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During a system initialization, the Meridian 1 maintains all calls established prior to the initialization.While the Meridian 1 system protects established calls, some third party switches can tear down active calls due to the resetting of data links in Layer 2.

The DASS2/DPNSS1 INIT Call Cut Off feature maintains established calls during a system initialization when the Meridian 1 is connected to third party Private Branch Exchanges (PBX) with DASS2/DPNSS1.

For this feature, the Meridian 1 initialization procedures are modified to prevent the following: LED from lighting and a disable message from being sent to the DASS2/DPNSS1 Dual D-channel Daughterboard (NTAG54).The Meridian 1 averts the disable message in Layer 2. This prevents the third party PBX from sending a the Clear Request Message (CRM). On some third party PBX's the Clear Request Message is interpreted as a reset of Layer 3 which also leads to the resetting of Network Layer 3. In the event that Layer 3 is reset, all established calls would be cleared by some third party PBX's.

When the DASS2/DPNSS1 INIT Call Cut Off feature is configured, the Dual D-channel Daughterboard (NTAG54) is prevented from sending Layer 2 network messages in relating to alarms handled during initialization. When the Meridian 1 initializes, all established calls are preserved when connected to third party PBX's with DASS2/DPNSS1.

If this feature is configured on older hardware such as NT6011, NT5K75 and NT3K35, then the software message is still sent to the hardware. However, the hardware does not respond like the Dual D-channel Daughterboard (NTAG54). Instead, the hardware becomes disabled.

Operating parameters

This feature is not applicable to the Meridian 1 Option 11C.

DASS2/DPNSS1 INIT Call Cut Off requires the following hardware: NTAG54AA and NTCK43AB.

The NTAG54AA is a Dual D-channel Daughterboard that supports DASS2/DPNSS1 with the Dual Primary Rate Interface (PRI) NTCK43AB vintage or higher.

This feature is not supported over Analog Private Network Signal Systems (APNSS) because of the Dual D-channel Daughterboard hardware requirement.

After system initialization is complete, the existing maintenance procedures attempt to enable all Dual D-channel Daughterboard (NTAG54) cards.

Feature interactions

There are no feature interactions associated with this feature.

Feature packaging

DASS2/DPNSS1 INIT Call Cut Off requires Integrated Digital Access (IDA) package 122. Depending on signalling type, one of the following packages is also required:

- Digital Private Network Signaling System 1 (DPNSS) package 123
- Digital Access Signaling System 2 (DASS2) package 124

Feature implementation

LD 74 – Modify the Digital Private Network System Signalling No.1 link data block.

Prompt	Response	Description
REQ	CHG	Change existing data
TYPE	DDLS	Digital Private Network System Signaling No.1 link data block
...		
S2	(0)-1	Switch 2 mode (the mode selected with the switch S2 located on the NT5K75AA DCHI cards) where: 0 = NT5K35AA DCHI or NT5K75AA DCHI cards operating in standard mode (default) 1 = NT5K75AA DCHI card operating in expanded mode
DDSL	0-n	DPNSS link number where: n = 63 for NT5K35AA or NT5K75AA in standard mode (S2=0) n =159 for NT5k75AA in expanded mode (S2=1).
SIGL	DA	DASS2 Level 2 Signaling
DDCS	0-159	Digital Trunk Channel Switch loop number
PRIV	(YES) NO	Private link where: DPNSS1 DASS2
- SIDE	aaa	Side for termination where: aaa = AETBNT for DPNSS1 or BNT for DASS2
- MWIF	(STD) ISDM	Message Waiting Indication
-L2_RST	(YES) NO	Reset Layer 2 indication during system initialization NO should only be entered when using the Dual D-channel Daughterboard (NTAG54) on a D-channel Primary Rate Interface (NTCK43) card. If this prompt is set to NO on an NTG011 or NT5K75 type card will be left disabled after INIT occurs.

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Diversion

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DPNSS1 Diversion is a British Telecom Network Requirement (BTNR) service that provides full DPNSS1 Diversion signaling on DPNSS1 links, when one of the redirection features listed below is invoked:

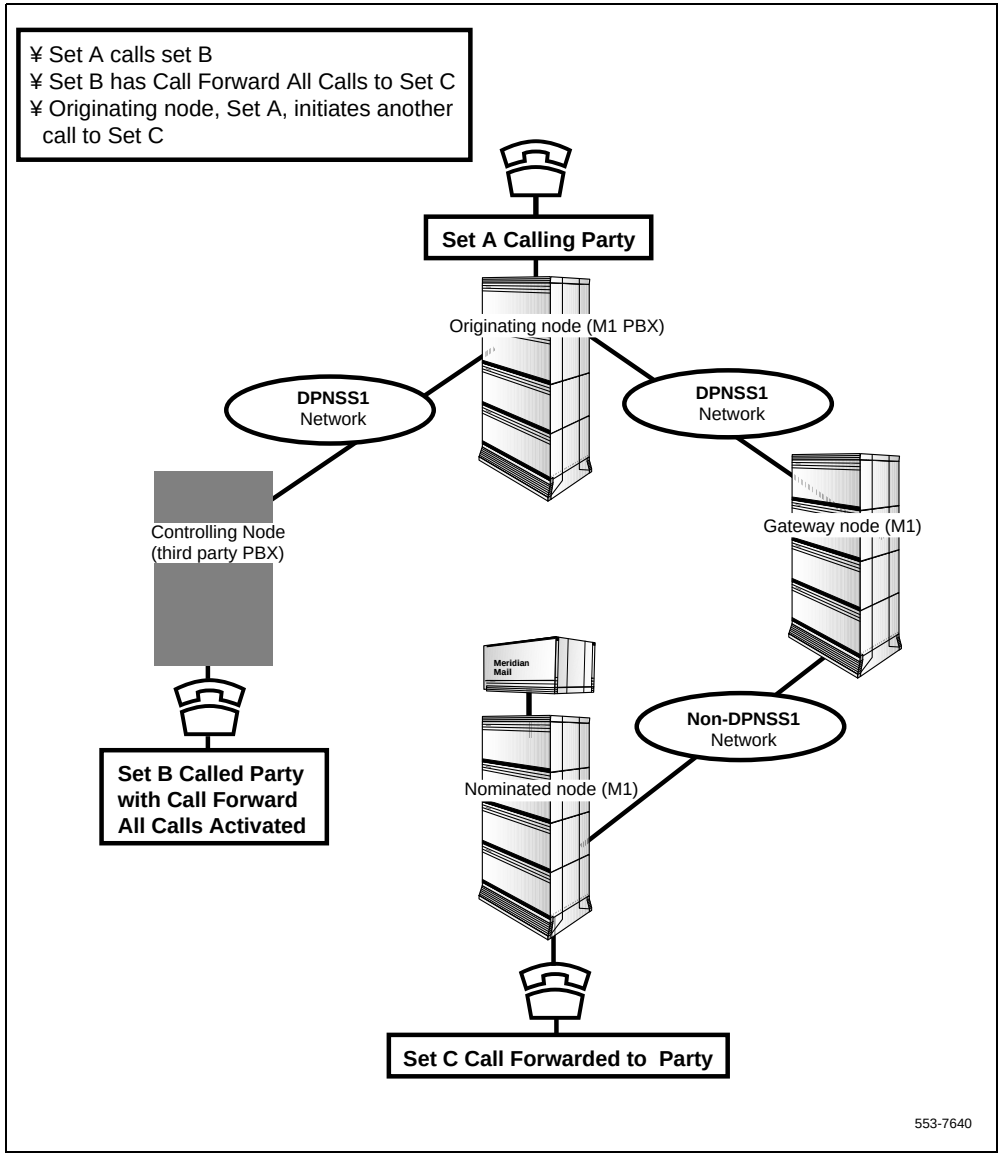
- Call Forward All Calls
- Call Forward No Answer
- Call Forward by Call Type
- Call Forward Busy
- Hunting/Group Hunting

- Intercept Computer Call Forward All Calls
- Call Forward Internal Calls
- Meridian Customer Defined Network Call Redirection
- Call Party Name Display

When a set activates a redirection feature such as Call Forward All Calls, DPNSS1 signaling informs the call originating node that the call is being forwarded to another telephone. If the forwarded party is located on another node, the call originating node is requested to initiate a new call. When the forwarded to party is reached by the call originator via DPNSS1, the forwarded to party is notified that the incoming call has been forwarded.

As illustrated in Figure 1 on page 59, Call Diversion functions on Meridian 1 nodes that are linked to third party Private Branch Exchanges (PBXs) within a DPNSS1 network. Meridian 1 gateway nodes provide links to other Meridian 1 nodes by Meridian Customer Defined Network (MCDN) and to Meridian 1 and third party PBX through DPNSS1.

Figure 1
DPNSS1 Diversion Environment


¥ Set A calls set B
¥ Set B has Call Forward All Calls to Set C
¥ Originating node, Set A, initiates another call to Set C
Set A Calling Party
Originating node (M1 PBX)
DPNSS1 Network
DPNSS1 Network
Controlling Node (third party PBX)
Gateway node (M1)
Meridian Mail
Non-DPNSS1 Network
Nominated node (M1)
Set B Called Party with Call Forward All Calls Activated
Set C Call Forwarded to Party
553-7640

The following capabilities are provided as part of the DPNSS1 Diversion: Diversion Validation, Diversion Cancellation, Diversion Follow-Me, Diversion By-Pass, Diversion Immediate, Diversion On Busy and Diversion On No Reply. These capabilities are described as follows.

Diversion Validation

DPNSS1 Diversion must operate on Meridian 1 nodes that are linked to third party PBXs, within a full DPNSS1 environment. Validation is performed on forwarded-to DNs, for example.

Meridian 1 gateway nodes are linked with other Meridian 1 nodes through a Meridian 1 Customer Defined Network (MCDN) and the other Meridian 1, or to other third party PBXs via a DPNSS1 network.

Diversion Cancellation

Diversion Cancellation allows the forwarded to party to remotely deactivate call diversion initiated by the forwarding party. Meridian 1 DNs cannot originate Diversion Cancellation requests; however, Meridian 1 PBXs can process Diversion Cancellation requests.

The sequence for Diversion Cancellation is as follows:

- Telephone A has activated Call Forward All Calls (CFAC) to Telephone B.
- Telephone B, the forwarded to party, requests either Diversion Immediate or Diversion-All Cancellation to Telephone A.
- Upon receipt to the cancellation request, Telephone A’s node determines that Telephone B is currently Call Forward All Calls (CFAC) activated to Telephone A’s DN.
- If the DN is confirmed, then the CFAC feature is deactivated.
- Telephone B is notified that the cancellation request is successful.

If Diversion Cancellation request encounters any gateway, the gateway responds with a “Service Unavailable” notification.

Diversion Follow-Me

Diversion Follow-Me allows the forwarding party to remotely request and change the forwarded-to DN. As an example, Telephone A has activated Call Forward All Calls to Telephone B, in a full DPNSS1 environment. Telephone A then decides to change the forwarded-to party to Telephone C. When Diversion Follow-Me is activated, Telephone A's node uses Diversion Validation to confirm that the new forwarded-to DN is valid.

If a Diversion Follow-Me request encounters any gateway, the gateway responds with a "Service Unavailable" notification. A Follow-Me request is always rejected when routed through a gateway.

Meridian 1 PBXs can process Diversion Follow-Me requests but cannot initiate any requests.

Diversion By-Pass

Diversion By-Pass allows the calling party to ignore the diversion assigned by the party that activated call redirection. Meridian 1 DNs cannot originate Diversion By-Pass requests, but can process requests.

Diversion Immediate

With Diversion Immediate, the calling party, Telephone A, dials Telephone B that has activated Call Forward All Calls (CFAC) to Telephone C. Upon receipt of the call, Telephone B's node instructs Telephone A's node to Divert-Immediate to Telephone C.

When instructed to divert, Telephone A's node clears the old call and initiates a new call to Telephone C. Telephone A's display is updated with diversion information, when the call is established with Telephone C.

Diversion On Busy

The sequence for Diversion On Busy via Separate Channel is similar to Diversion-Immediate. The differences occur with message contents and the reason for diversion, if Call Party Name Display is activated.

If Diversion on Busy is triggered by the Hunt feature, it is also triggered by Call Forward By Call Type applied to Hunt. A node determines an internal call on the Calling Line Category (CLC) received with the incoming call.

For Call Forward Busy, the following two cases exist. If the forwarded set has enabled Message Waiting Forward Busy, the call may be directed to the FDN or Message Waiting key. In this case, the Diversion On Busy signaling applies. However, if the forwarded set is not equipped with Message Waiting Forward Busy, the call is always routed to the Attendant.

Diversion On No Reply

Call Diversion on No Reply ensures that a Call Forward No Answer (CFNA) call is not disconnected until the new diversion call is successful.

The following is the sequence for Diversion On No Reply functionality. Telephone A, the calling party, dials Telephone B. Telephone B rings and has Call Forward No Answer activated to Telephone C. When requested by Telephone B's node to Divert the call on No Reply, Telephone A's node initiates a new call to Telephone C. When Telephone C answers the diverted call, the original call between Telephone A and Telephone B is disconnected.

Operating parameters

Interworking with MCDN Trunk Route Optimization (TRO) is supported.

On Meridian 1 nodes, M3000 Meridian 1 proprietary sets are not supported when using DPNSS1 signaling.

The Nominated party's, the forwarded-to telephone, display is updated in full DPNSS1 or mixed DPNSS1/MCDN routes. The Nominated party can be Meridian Mail.

Access forwarding to Meridian Mail via a full DPNSS1 environment operates from Release 20 and later Meridian 1 nodes. Access forwarding to Meridian Mail via full MCDN/DPNSS1 gateway operates if all the gateways between the calling party and the Meridian Mail host node are Release 22 Meridian 1 nodes.

The Message Waiting Indication (MWI) key of a Meridian 1 DN is never lit if reached from a Meridian 1 Meridian Mail node via DPNSS1. No Message Waiting Indication signaling is implemented on DPNSS1 between Meridian 1 nodes. No MCDN/DPNSS1 functionalities exist for Meridian Mail Message Waiting Indication capabilities.

In a mixed Uniform and Coordinated Dialing Plan environment, it is recommended to always use the Uniform Dialing Plan (UDP) format for forwarded data.

Feature interactions

Attendant Forward No Answer

If an incoming call is handled for Network Attendant Services routing towards DPNSS1, no diversion signaling is sent back to the calling party.

Call Forward All Types

The Call Forward All Types features on unanswered calls are activated in the following order: Call Forward All Calls, Message Waiting, Call Forward No Answer, Slow Answer Recall. For busy sets the order is: Call Forward All Calls, Hunting, Calling Waiting/Camp On, Message Waiting Busy Forward, Call Forward Busy.

Group Hunting

Only simple DPNSS1 calls support Group Hunting. Group Hunting is not supported on all DPNSS1 features.

Meridian Mail

Following DPNSS1 Diversion, the new call can reach Meridian Mail via full MCDN, full DPNSS1 and mixed MCDN/DPNSS1 links. Following MCDN Call Forward towards DPNSS1, the new call can reach Meridian Mail via full MCDN, full DPNSS1 and mixed MCDN/DPNSS1 links.

Night Service

If a diverted call encounters an attendant in night service, the call receives Night Service Diversion if available.

Phantom Directory Numbers
Phantom Terminal Numbers

If an incoming call to a Phantom TN contains a DIVERSION BY-PASS REQUEST, Call Forward All Calls applies.

Route Optimization

If a Route Optimization call setup encounters any redirection features, these features are ignored.The condition for a diverted call to have Route Optimization after connection is the same as a simple DPNSS1 call. Route Optimization starts if the diverted call is routed through a non-first choice route or when a call transfer involving the diverted call is completed.

User Selectable Call Redirection

The User Selectable Call Redirection feature triggers Diversion Validation. If the numbering plan is DPNSS1 then diversion occurs. Numbering plan routes are checked to determine if redirection DN's are through DPNSS1 on a first choice route basis. If the number plan is not a DN through DPNSS1, then User Selectable Call Redirection works as usual.

Feature packaging

DPNSS1 Diversion requires DPNSS1 Network Services (DNWK) package 231.

Basic DPNSS1 networking requires:

- Integrated Digital Access (IDA) package 122
- Digital Private Network Signaling System 1 (DPNSS) package 123
- 2.0 Mbps Primary Rate Interface (PRI2) package 154

DPNSS1/MCDN Gateway requires:

- International Supplementary Features (SUPP) package 131
- Integrated Services Digital Network (ISDN) package 145
- ISDN Advanced Network Services (NTWK_SRVC) package 148
- Network Attendant Services (NAS) package 159
- ISDN Call Connection Limitations (ICCL) package 161 for gateway with loop avoidance

Feature implementation

For DPNSS1 Diversion to occur the redirection features DPNSS1 Three-Party Service and Network Call Redirection must be configured. DPNSS1 Three-Party Service is configured in Overlay 95. Network Call Redirection is configured in Overlays 15,16, 95, 10 and 11.

LD 95 – Configure call display transfer indication for DPNSS1 Three-Party Service.

Prompt	Response	Description
REQ	NEW CHG	Add new data Change existing data
TYPE	CPND	Calling Party Name Display data block
CUST	xx	Customer number
...		
RESN	YES	Display of Reason for redirecting calls allowed
- XFER	 xxxx (T)	Call Transfer display mnemonic (Mnemonic for call transfer display in Network Call Redirection (NCRD). One to four characters are accepted. (Default)

LD 15 – Forward calls to a forwarding DN.

Prompt	Response	Description
REQ:	CHG	Change existing data block
TYPE:	CDB RDR	Customer Data Block Call Redirection data (Release 21 gate opener)
CUST	xx	Customer number
...		
- FNAD	FDN	Call forward no answer DID calls—Flexible CFNA DN

- FNAT	FDN	Treatment for External CFNA calls (non-DID—when FDN is selected, CFCT handles the call)
- FNAL	FDN	Requests treatment for CFNA—when FDN is selected, DID calls are forwarded
...		

LD 16 – Allow Network Call Redirection.

Prompt	Response	Description
REQ	CHG	Change
TYPE	RDB	Route Data Block
CUST	xx	Customer Number
ROUT	0-511	Route Number
...		
NCNA	(NO) YES	Network Call Name is (is not) allowed
NCRD	(NO) YES	Network Call Redirection. Allows network call redirection messages to be sent (or blocks messages if NCRD= NO) Network Call Redirection can occur without answering YES to the NCRD prompt. This prompt only controls the sending of Network Call Redirection messages, not the actual redirection of the call. The message supplied when NCRD = yes provides the information for the CLID display. When NCRD is NO, the call is redirected without the CLID redirection information. It is appropriate to set NCRD = no when your network interfaces with a network that is equipped with an earlier version of ISDN than Release 14.
TRO	(NO) YES	Trunk Optimization TRO economizes trunk use throughout the network as part of the NCRD feature

LD 95 – Display the reason calls are redirected.

Prompt	Response	Description
REQ	CHG	Change
TYPE	CPND	Call Party Name Display data block
CUST	xx	Customer number
ROUT	0-511	Route Number
...		
DES	(NO) YES	Designator for Multiple Appearance DNs allowed
RESN	YES	Allow display of reason for redirecting calls
CFWD	(F) xxxx	Display mnemonic for (Network) Call Forward All Calls. Default is "F." Enter the mnemonic that represents NCFAC on a set's CLID display.
CFNA	(N) xxxx	Mnemonic for (Network) Call Forward No Answer display. Enter the mnemonic that represents NCFNA on a set's CLID display. Default is "N."
HUNT	(B) xxxx	Mnemonic for Network Hunting display
PKUP	(P) xxxx	Mnemonic to allow Call Pickup display
XFER	(T) xxxx	Mnemonic for Call Transfer display

LD 95 – Give each DN a name.

Prompt	Response	Description
REQ	CHG	Change
TYPE	NAME	Call Party Name Display name entry
CUST	xx	Customer number

DIG	xxx xx	An existing Dial Intercom Group number (0-253) and member number (0-99)
NAME	aaa...a	CPND name using ASCII characters. The DIG prompt is re-prompted. Enter <CR> to get the DN prompt
DN	xxxx	DN of eligible type

LD 10 – Enable the appropriate feature in the data block.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	500	Enter set type
HUNT	xxxx	Hunt DN for internal calls
FTR	EFD xxx	External Flexible call forward DN Only allowed if LD15 is properly configured: FNAD = FDN FNAL = FDN FNAT = FDN If the DNXP package is equipped, up to 7 digits are allowed; otherwise, only 4 digits can be entered. Accepted only if CLS is MWA or FNA.
	EHT xxxx	External Hunt DN Only allowed if CLS = CFTA Same digits defined as above
	FDN xxxxxxx	Flexible Call Forward No Answer DN (cannot be an LDN) Same digits defined as above

LD 11 – Enable the appropriate feature in the data block.

Prompt	Response	Description
REQ:	CHG	Change.
TYPE:	xxxx	Enter set type
FDN	x..x	Flexible CFNA DN where xx is the MCDN. The FDN value should include AC1/AC2 when applicable (up to 13 digits).
EFD	xxxx	Network CFNA DN for External calls
HUNT	xxxx	Network Hunt DN for calls with CLS = CFTD
EHT	xxxx	Network Hunt DN for External calls

Feature operation

Activating Call Forward All Calls over DPNSS1

Telephone A invokes Call Forward All Calls (CFAC) to Telephone B, the forwarded to party over a DPNSS1 network. In a non-DPNSS1 network environment, then the Call Forward All Calls is normal operation.

1 If the dialing plan reaches Telephone B via DPNSS1, a VALIDATION REQUEST is sent to Telephone B. The CFAC key remains flashing.

2 Upon receipt of the request, Telephone B's node responds to the validity of Telephone B's DN. If the DN is valid, the CFAC feature is activated. The CFAC key is lit. However, if the DN is not valid, Telephone A hears an overflow tone, and the CFAC key remains flashing.

3 If the forwarded DN is local or reached through a non-DPNSS1 network, the usual CFAC activation process applies. No DPNSS1 messaging occurs.

DPNSS1 Message Waiting Indication

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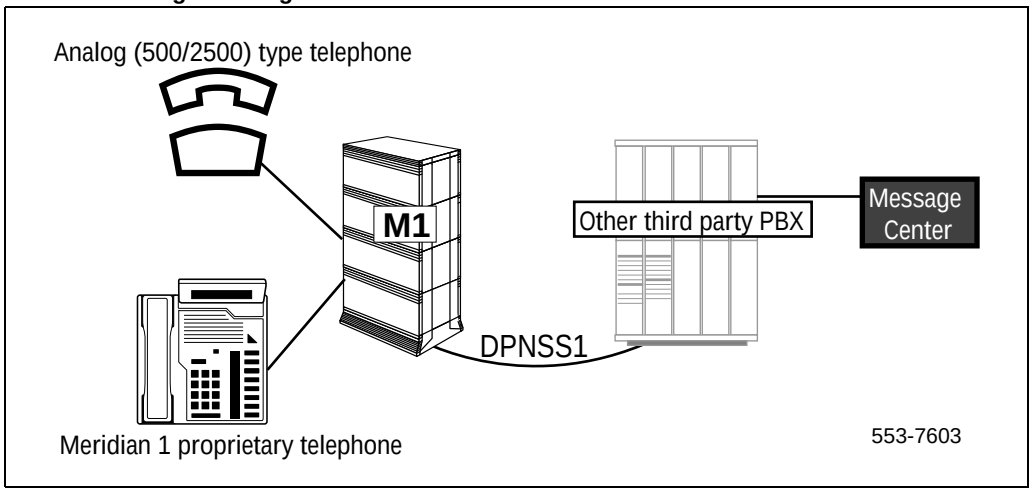
With the DPNSS1 Message Waiting Indication (DMWI) feature, Meridian users can subscribe to a third party voice message system across a Digital Private Network Signalling System No. 1 (DPNSS1) network.

When provisioned, this feature provides a means to pass Message Waiting Indication across a private DPNSS1 network with Meridian 1 and other third party PBXs. This feature allows the Meridian 1 to recognize DPNSS1 Non-Specified Information (NSI) from a third party voice message node. This recognition capability allows a voice message system located on another node to notify or cancel Message Waiting Indication for Meridian 1 users.

Figure 2 on page 72 illustrates DPNSS1 Message Waiting Indication.

Figure 2
DPNSS1 Message Waiting Indication



DPNSS1 Message Waiting Indication interworks with the DPNSS1 Call Diversion feature. The DPNSS1 Call Diversion Feature automatically routes an incoming trunk or an internal call to a third party voice message node if the call is not answered on the Meridian 1 node. When a calling party leaves a message for the called party, the voice message node sends a message waiting notification to the controlling node. When the called party retrieves the voice message, a message waiting cancellation is sent by the host node to the controlling node where the Meridian 1 user is located.

For telephones equipped with a visual message waiting device such as an LCD or LED, message notification is provided by lighting the device and message cancellation by switching off the device. Otherwise, the indication and cancellation is provided by an audible indication when the called party goes off-hook.

Operating parameters

DPNSS1 Call Diversion feature is a prerequisite for the DPNSS1 Message Waiting Indication feature. With DPNSS1 Call Diversion, one of the following redirection features must be configured: Call Forward All Calls, Call Forward No Answer, Call Forward by Call Type, Call Forward Busy, Hunting/Group Hunting, ICP Forward All Calls or Internal Call Forward.

This feature is only supported on analog (500/2500 type) sets and Meridian 1 proprietary sets.

DPNSS1 Message Waiting Indication is supported across Analog Private Network Signaling System (APNSS).

The size of a parameter for a Message Waiting Indication non-specified information (NSI) string is limited to 80 characters. The size of all parameters for a Message Waiting Indication non-specified information (NSI) string is limited to 126 characters. String size limitations do not include octothorpe (#) or asterisk (*) delimiters.

The DPNSS1 Message Waiting Indication does not check the presence and validity of a suffix following a non-specified information identifier.

This feature supports Coordinated Dialing Plan (CDP) and Uniform Dialing Plan (UDP).

The total limit of configured Message Waiting Indication (MWI) Non-Specified Information (NSI) tables must not exceed 512. The size of an MWI NSI consists of adding up the table's number of parameters, the total number of characters for the table's parameters and the number 7. Any creation or change that causes this limit to be exceeded, results in the output of an error message (SCH0097).

Any number of DPNSS1 trunks can be involved in the path between the Voice Messaging System and the Meridian 1. Prior to release 23.30, if a non-DPNSS1 trunk is involved in this path, then the DPNSS1 Message Waiting Indication feature is not supported. If this occurs, the Message Waiting Indication NSI is not passed at the gateway node.

With release 23.30, a Message Waiting Indicator message can pass across a DPNSS to a Meridian Customer Defined Network (MCDN) or an MCDN to DPNSS gateway. The gateway feature is only applicable when the controlling set is on a Meridian 1 system. This feature only creates a gateway between a DPNSS and an MCDN link to another Meridian 1 switch.

> ***Note:*** The Nortel MWI NSI string must be configured at the gateway node and at both ends of the DPNSS link for the receiving M1 to recognize the NSI string in the incoming Initial Services Request Message (ISRM).

Feature interactions

Network Messaging Service

With the DPNSS1 Message Waiting Indication feature prior to release 23.30, no gateway functionality between MCDN and DPNSS exists for Meridian Mail access or message waiting capabilities. With release 23.30, an MCDN-DPNSS gateway functionality exists for Meridian Mail access and message waiting capabilities.

Feature packaging

The DPNSS1 Message Waiting Indication requires DPNSS Message Waiting Indication (DMWI) package 325.

All Meridian 1 nodes require the following packages:

- Integrated Digital Access (IDA) package 122
- Digital Private Network Signaling System (DPNSS) package 123

The Meridian 1 originating node (i.e. node with calling party) and controlling node (i.e. node with Message Center users) require DPNSS1 Network Services (DNWK) package 231 for the DPNSS1 Call Diversion feature.

Meridian 1 controlling nodes require the following packages:

- End-to-End Signaling (EES) package 10
- Message Waiting Center (MWC) package 46

For an audible Message Waiting Indication on analog (500/2500 type) sets, Flexible Tones and Cadences (FTC) package 125 is required.

For a Message Waiting announcement, Message Intercept (MINT) package 163 is required.

Feature implementation

Prior to configuring DPNSS1 Message Waiting Indication, the DPNSS1 Call Diversion feature must be configured and one of the following redirection features must also be activated:

- Call Forward All Calls,

- Call Forward No Answer,
- Call Forward by Call Type,
- Call Forward Busy,
- Hunting/Group Hunting,
- ICP Call Forward All Calls
- Internal Call Forward.

To configure, refer to the DPNSS1 Call Diversion feature in this guide.

LD 15 – Add, change or delete a Message Waiting Indication NSI table.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
TYPE:	NET	Networking data block
CUST	xx	Customer number
...		
DMWM	YES	Enable output of error messages (NO) = disables output of error messages (default)
MWNS	YES	Recognize Message Waiting Indication NSI string (NO)= Do not recognize Message Indication NSI string (default)
- REQ	(NEW)	Create new NSI table (default) OUT = Delete Message Waiting Indication table

- MFID	a	Enter the Manufacturer Identifier of the Message Waiting Indication NSI table to add, change, or delete, where a = any alpha character or <CR> SCH9996 message will appear if the command CHG is entered and no Message Waiting Indication NSI tables corresponds to the alpha character entered. When this occurs, the MFID prompt is re-prompted. SCH0097 will appear if the NEW or CHG commands are entered and if the number of MWI NSI tables for the customer exceeds the limit (512). If the prompt XALL is entered, then all existing Message Waiting Indication NSI tables are deleted.
- - NOTI	YES NO	YES = NSI string for Message Waiting Notification If NO or <CR> is entered on NEW command then the SCH0274 message is output If NO or <CR> is entered on CHG command then CANC is prompted
- - MSSC	a	Manufacturer specific service character for MW notification where a = any alphanumeric character is accepted for an SIS parameter. If <CR> is entered on NEW command then the SCH0274 message appears and MSSC is re-prompted. If <CR> is entered on CHG command then PRMT prompt appears. If a = a character that is not an alphanumeric character, then SCH008 appears and MSSC is reprompted.
- - - PRMT	aaa	NSI parameter(s) for Message Waiting Notification, where aaa = any alphanumeric sequence is accepted for a SIS parameter to a maximum of 126 characters PRMT appears until <CR> is entered If aaa includes a character that is not an alphanumeric character, then SCH008 appears and PRMT is reprompted.
- - CANC	YES NO	YES = NSI string for Message Waiting Cancellation. If NO or <CR> is entered on NEW command then the SCH0274 message appears and CANC is re-prompted. If NO or <CR> is entered on CHG command then the MFID prompt appears.

- - - MSSC	a	Manufacturer specific service character for Message Waiting cancellation where a = any alphanumeric character is accepted for an SIS parameter.
- - - PRMT	aaa	NSI parameter(s) for Message Waiting Cancellation where aaa = any alphanumeric sequence is accepted for an SIS parameter to a maximum of 126 characters. PRMT appears until <CR> is entered. When REQ = CHG, both cancellation and notification, once <CR> is entered at the PRMT prompt, the only parameters kept are the ones that have just been entered. Any existing parameters not re-entered are removed from the MWNS.

LD 10 – Allow Message Waiting Class of Service.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
TYPE:	500	Type of telephone set
TN	l s c u c u	Terminal Number For Option 11C
...		
CLS	MINA	Message Interrupt Allowed MIND = Message Interrupt Denied (default)
CLS	MWA	Message Waiting Allowed MWD = Message Waiting Denied (default)

Note: To receive an announcement as a message waiting indication, analog (500/2500 type) sets must configure the Message Intercept feature and activate Flexible Tones and Cadences (FTC) in LD 56.

LD 56 – Message Intercept and Flexible Tones and Cadences.

Prompt	Response	Description
REQ	NEW, CHG	Add new data Change existing data
TYPE	FTC	Flexible Tones and Cadences data block
TABL	0 - 31	Flexible Tones and Cadences Table number
...		
MINT	YES	Allow tones or announcements NO = Deny tones or announcements (default)
- MWAN	0 - 255 0 - 255	Message Waiting

Note: If the Message Intercept feature is not equipped, a Message Waiting dial tone is provided on a set basis if this tone has been defined in Tones and Cadences data block in LD 56. Or, Call Forward Message Waiting tone is provided if Call Forward Message Waiting has been defined in LD 56 and the set has Call Forward Active.

LD 11 – Allow Message Waiting Class of Service.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
TYPE:	xxxx	Telephone type, where: xxxx = SL1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, 2317, 2616, or 3000
TN	l s c u c u	Terminal Number For Option 11C

...		
CLS	MWA	Message Waiting Allowed (MWD) = Message Waiting Denied (default) If CLS = MWA and no Message Waiting Key (MWK) is defined, then broken dial tone is provided for message waiting notification

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Executive Intrusion

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Digital Private Network Signaling System 1 (DPNSS1) Executive Intrusion enables an originating party to break-in to an established call under certain circumstances. The Meridian 1 only allows this feature to be activated from Attendant Consoles; however, it will accept an Executive Intrusion activation request from a regular telephone on a third-party PBX.

For the purposes of this feature description, the term “requested” party will be used to describe the person on the established call who the originating party desires to talk with, and the “unrequested” party will mean the person on other end of the call. On a Meridian 1, Executive Intrusion is only activated if the attendant places the call to the requested party over a DPNSS1 link. If the attendant and the requested party are located on the same node, the current Attendant Break-in feature is activated. Executive Intrusion is activated by using the existing Break-In key on an Attendant Console.

When an attendant presses the Break-In (BKI) key to invoke Executive Intrusion, the node where the requested party resides checks the Intrusion Capability Level (ICL) of the Attendant Console against the Intrusion Protection Levels (IPLs) of the parties involved in the call. If the ICL is higher than the IPLs, Executive Intrusion is allowed and a conference is set up between the attendant, requested, and unrequested parties.

Operating parameters

The Meridian 1 implementation of Executive Intrusion can be used on a Meridian 1 in any environment where DPNSS1 connectivity is involved.

Executive Intrusion with prior validation is not supported.

Withdrawal from Intrusion is not supported.

Executive Intrusion has the same limitations as Post-Dial Attendant Break-In as follows:

- Only one Break-In/Executive Intrusion key is allowed per Attendant Console
- An Executive Intrusion connection cannot be put on hold
- Only one attendant at a time is allowed to intrude for a given connection
- Executive Intrusion is permitted only if the requested party is a BCS or PBX set and has Warning Tone Allowed (WTA) Class of Service

In a full DPNSS1 environment, Executive Intrusion adds the following limitations:

- Executive Intrusion is permitted only if the unrequested party is a BCS or PBX set having Warning Tone Allowed (WTA) Class of Service
- Executive Intrusion is not permitted if the requested or unrequested party is involved in a conference

In a DPNSS1/Meridian Customer Defined Network (MCDN) gateway between the originating party and the requested party, Executive Intrusion is not permitted if Call Offer has been activated at the terminating node by the same attendant. Call Offer takes precedence over Executive Intrusion in a DPNSS1/MCDN gateway.

In a DPNSS1/MCDN or MCDN/DPNSS1 gateway between the originating party and the requested party, only Executive Intrusion activation requests from attendants are supported. Executive Intrusion from sets on a third party PBX are ignored in an DPNSS1 Initial Service Request Message (ISRM) and rejected in a DPNSS1 End-to-End Message (EEM).

At the gateway node, if mixed MCDN/DPNSS1 route lists are programmed, an incoming MCDN call using an outgoing DPNSS1 route for the first call attempt (without Executive Intrusion) will also use a DPNSS1 route for the Executive Intrusion request.

The following hardware is required for all Meridian 1 Options other than the Option 11/11E/11C:

- DASS2/DPNSS1 D-channel Interface Handler
  - — Standard Mode (0-15 D-channels) – NT5K35AA
  - — Expanded Mode (0-159 D-channels) – NT5K75AA or NT6D11AE
- 2 Mbps Primary Rate Interface Card – NT8D72
- Network Interface Card – QPC414
- Clock Controller Card – QPC775

On the Option 11/11E/11C the following hardware is required:

- DPNSS1 XPRI2 – NTAK799

Feature interactions

Interactions with other DPNSS1 Services

DPNSS1 Diversion

In the following scenario an Executive Intrusion request is made on a diverted call (Immediate). Telephone B has diversion immediate active to Telephone C (Telephone B is on a third-party PBX). Telephone C may be on the same node or on another node. C is busy on an call with another set. The attendant calls B. The answer to the Initial Service Request Message (ISRM) is a Number Acknowledge Message (NAM) with a Destination Address of C. The attendant position then sends a regular ISRM to C. Since C is busy, the attendant receives Clear Request Message (CRM) in response to the ISRM. The attendant presses the BKI key. In this case, an Executive Intrusion ISRM is sent to C, and C is considered the requested party.

In the following scenario an Executive Intrusion request is made on a diverted call (Busy). Telephone B has diversion on busy active to Telephone C. Telephone C may be on the same node or on another node. Both B and C are busy on calls with other sets. The attendant sends a regular ISRM to C. Since C is busy, the attendant position receives a Clear Request Message in response. The attendant presses the BKI key. In this case, an Executive Intrusion ISRM is sent to C, and C is considered the requested party.

DPNSS1 Route Optimization

If the requested party is involved in a Route Optimization process when it receives an Executive Intrusion request, the request is rejected. Conversely, the originating, requested and unrequested parties will be able to send a Route Optimization request only after the Executive Intrusion conference reverts to a simple call. Finally, if an Executive Intrusion request is received after a Route Optimization Request Supplementary Information String has been sent but Route Optimization has not actually commenced, the Route Optimization process is aborted and the Executive Intrusion may proceed.

DPNSS1/Uniform Dialing Plan Interworking

DPNSS1/Uniform Dialing Plan Interworking does not affect Executive Intrusion operation, except with regard to displays. The Executive Intrusion states normally displayed are Coordinated Dialing Plan Calling Line IDs and Originating Line IDs. If a Uniform Dialing Plan is active in the network, displays will change to Uniform Dialing Plan Calling Line IDs and Originating Line IDs.

Executive Intrusion denied for the Wanted Node during DPNSS1 Three-party Service

Executive Intrusion will not be allowed if either the requested or unrequested party is involved in an enquiry call. In addition, Executive Intrusion will be denied if the requested party or the unrequested party is the controlling or the added-on party of a three-party conference call. The third party (the one held during the enquiry call before the conference is completed) is not subject to this restriction.

Step Back on Congestion

If Step Back on Congestion (SBOC) is active, an ISRM containing an Executive Intrusion request will undergo the SBOC routing process as per any other call.

Other interactions

Attendant Blocking of DN

If an Executive Intrusion attempt is made for an Attendant Blocking of DN call, the Executive Intrusion attempt is denied.

Attendant Conference

If an Executive Intrusion conference is established on the Destination side, pressing the Attendant conference key is ignored.

Attendant Secrecy
Enhanced Secrecy

If attendant secrecy is not active when the attendant attempts Executive Intrusion, the source is automatically excluded. If Enhanced Secrecy is equipped, source exclusion includes the removal of the Enhanced Secrecy warning tone when Executive Intrusion is activated.

Automatic Call Distribution (ACD)

Once the requested party has established the call with an ACD agent, the attendant is able to intrude into the call. However, if the requested party is in an ACD queue, Executive Intrusion is denied.

Break-In
Break-In to Enquiry Calls
Break-In with Secrecy
Break-In Indication – Prevention

Executive Intrusion and Break-In are mutually exclusive. Pressing the BKI key will activate Break-In or Executive Intrusion. In addition, intrusion is not allowed into a Break-In conference.

Call Park

Attempts to intrude into a parked call receive Executive Intrusion Denied treatment.

Call Waiting

Executive Intrusion is permitted (consult-only state) into a requested party having call waiting.

Conference Enquiry Calls

Executive Intrusion is denied if the requested party is established in a local conference, or if the requested party is involved in an enquiry call. These restrictions may apply to the unrequested party depending on the connection being used between the requested and unrequested parties.

Data Calls

Executive Intrusion cannot be applied to data calls.

Hold or Permanent Hold

Executive Intrusion is denied if the requested party is put on hold by another station at the same node. This restriction also applies to the unrequested party if the unrequested party is located at the same node as the requested party (standalone) or if the requested party and the unrequested party are linked via DPNSS1.

Hunting

If Executive Intrusion is attempted against an extension with a Hunt DN configured, an attempt will be made to reroute the call to the hunt DN provided the Hunt DN is on the same node. If the Hunt DN is busy, this rerouting process is repeated. If all DNs in the Hunt chain are busy, Executive Intrusion is attempted against the wanted extension originally dialed. Otherwise, the call will terminate as a simple call on the first idle extension in the Hunt chain.

Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) Extension

Activation of Executive Intrusion for an ISDN BRI extension is not possible. Attempts to intrude on ISDN BRI extensions (either the requested or unrequested party) will fail.

Intercept Computer (Dial from Directory)

Executive Intrusion can be activated by dialing an extension DN from the Intercept Computer Terminal, and then pressing the BKI key on the Attendant Console.

Line Lockout

Executive Intrusion is not allowed for any set that is in Line Lockout state.

Make Set Busy
Do Not Disturb

Executive Intrusion is not allowed if either of these features is active at the requested party.

Multiple Appearance DN

If the attendant tries to extend a call to a DN which appears on more than one set, this DN can either be:

- Multiple-Call Arrangement with Ringing (MCR): when a call terminates on this DN, all idle stations on which the DN appears are rung. The call is established only with the station which has answered first. All others are idle.
- Multiple-Call Arrangement with No Ringing (MCN): the only difference between MCN and MCR is that the called stations are not rung (only their DN keys flash).
- Single-Call Arrangement with Ringing (SCR): when a call terminates on this DN, all idle stations on which the DN appears are rung. The call is established only with the station which has answered first. All others are busy.
- Single-Call Arrangement with No Ringing (SCN): the only difference between SCN and SCR is that the called stations are not rung (only their DN keys flash).

Switchhook Flash

If an analog (500/2500 type) telephone is part of an Executive Intrusion conference, any Switchhook Flash is ignored.

Feature packaging

DPNSS1 Executive Intrusion is included in Enhanced DPNSS1 Services (DPNSS_ES) package 288.

For configuration of Attendant Consoles the following package is required:

- Attendant Break-In/Trunk Offer (BKI) package 127

For basic DPNSS1 network functionalities the following packages are required:

- Integrated Digital Access (IDA) package 122
- Digital Private Signaling System 1 (DPNSS) package 123
- International Supplementary Features (SUPP) package 131
- Integrated Services Digital Network (ISDN) package 145
- 2.0 Mbps Primary Rate Interface (PRI2) package 154

The following package is required to provide DPNSS1 Loop Avoidance, Three-Party Service, Call Offer, Step Back on Congestion, and Route Optimization:

- DPNSS1 Network Services (DNWK) package 231

The following packages are required to provide DPNSS1/MCDN Gateway functionality:

- Advanced ISDN Network Services (NTWK) package 148
- Network Attendant Services (NAS) package 159
- ISDN Supplementary Features (ISDNS) package 161 (required to support MCDN/DPNSS1 gateway with Loop Avoidance)

Feature implementation

LD 10 – Allow warning tone for analog (500/2500 type) telephones.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	500	Telephone type
TN	l s c u c u	Terminal number Terminal Number for the Option 11
CLS	WTA	Class of Service. Warning tone allowed (WTA) must be set for Executive Intrusion

LD 11 – Allow warning tone for Meridian 1 proprietary telephones.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	aaaa	Telephone type, where aaaa = SL-1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, or 2616
TN	l s c u c u	Terminal number Terminal Number for the Option 11
CLS	WTA	Class of Service. Warning tone allowed (WTA) must be set for Executive Intrusion

LD 14 – Allow warning tone for trunks to permit Executive Intrusion.

Prompt	Response	Description
REQ	CHG	Change
TYPE	aaa	Trunk type, where aaa = ADM, AID, ATVN, AWR, CAA, CAM, COT, CSA, DIC, DID, FEX, ISA, MDM, MUS, PAG, RAN, RCD, RLM, RLR, TIE, or WAT
TN	l s c u c u	Terminal number Terminal Number for the Option 11
CLS	WTA	Class of Service. Warning tone allowed (WTA) must be set for Executive Intrusion.

LD 10 – Define PLEV for analog (500/2500 type) telephone.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	500	Telephone type
TN	l s c u c u	Terminal number Terminal Number for the Option 11

PLEV	n, (2)	Give PLEV n to the route (0 ð n ð 7)

LD 11 – Define PLEV for Meridian 1 proprietary telephones.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	aaaa	Telephone type, where aaaa = SL-1, 2006, 2008, 2009, 2016, 2018, 2112, 2216, or 2616
TN	l s c u c u	Terminal number Terminal Number for the Option 11
PLEV	n, (2)	Give PLEV n to the route (0 ð n ð 7)

LD 16 – Define PLEV for routes.

Prompt	Response	Description
REQ	CHG	Change
TYPE	RDB	Route Data Block
PLEV	n, (2)	Give PLEV n to the route (0 ð n ð 7)

The Meridian 1 ICL/IPL implementation uses the existing PLEV scale. PLEVs are defined in LDs 10 and 11 for sets, and LD 16 for routes. Make the IPL/PLEV mapping consistent with Priority Override/Forced Camp-On (POVR) operation in case both features exist.

The mapping is as follows:

- ICL/IPL for Attendants:

  Since attendants do not have any POVR priority, there is no PLEV – ICL and no PLEV – IPL mapping for attendants. When ICL information must be sent through DPNSS1, ICL =3 (maximum capability level) is assumed for the attendant. When an Executive Intrusion request is received from another node, IPL = 3 (maximum protection level: non intrudable) is assumed for the attendant.

- ICL for sets:

  Since sets cannot originate Executive Intrusion requests on the Meridian 1, there is no PLEV – ICL mapping for sets.

- IPL for sets (or routes):

  Make the PLEV – IPL mapping consistent with the meaning of PLEV for the POVR feature.

  The mapping is as shown in Table 3 on page 91.

Table 3
PLEV/IPL mapping for sets (Part 1 of 2)

PLEV of Set A	Meaning of POVR	IPL set A is considered to have	Meaning for Executive Intrusion
0	POVR not active: cannot override, cannot be overridden	3	Total protection: cannot be intruded
1	Cannot override, can be overridden by PLEVs 1-7	0	Minimum protection: can be intruded by ICLs 1-3
2	Can override PLEVs 1-2, can be overridden by PLEVs 2-7	1	Intermediate protection: can be intruded by ICLs 2-3
3	Can override PLEVs 1-3, can be overridden by PLEVs 3-7	2	Intermediate protection: can be intruded by ICL 3

Table 3
PLEV/IPL mapping for sets (Part 2 of 2)

4	Can override PLEVs 1-4, can be overridden by PLEVs 4-7	3	Maximum protection: cannot be intruded
5	Can override PLEVs 1-5, can be overridden by PLEVs 5-7		
6	Can override PLEVs 1-6, can be overridden b PLEVs 6-7		
7	Can override PLEV 7, can be overridden by PLEV 7		

As a consequence, the effect on an incoming EI request (ICL included) on a set with a PLEV configured is as shown in Table 4 on page 92.

Table 4
Effect of ICLs on different PLEVs for an EI request

ICL in the incoming EI request	PLEVs for which Executive Intrusion is allowed
1	1
2	1-2
3	1-3

LD 12 – Define a BKI/Intrusion key on the Attendant Console.

Prompt	Response	Description
REQ	CHG	Change
TYPE	1250 or 2250	Attendant Console type

TN	l s c u c u	Terminal number Terminal Number for the Option 11
KEY	xx BKI	Define key xx as the BKI key

Feature operation

From Attendant Consoles the Executive Intrusion feature operates in a similar manner to that of the existing Attendant Break-In feature as follows:

1 The attendant dials the destination DN.

2 The attendant receives busy tone.

3 The attendant presses the Break-In (BKI) key on the console.

4 If the ICL on the Attendant Console is higher than the IPLs of both the requested and the unrequested parties, a conference is established between all three parties.

5 After the unrequested party disconnects, the attendant can extend the incoming call to another DN if desired.

DPNSS1 Extension Three Party Service

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This section contains information on the following topics:

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Feature packaging 98
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Feature operation 101

The DPNSS1 Three-party Service feature allows a controlling party to place an established party on hold and make an inquiry call to a third party. The controlling party may then transfer the held party to the inquired-to party, or form a three-party conference. The three parties may be located anywhere across a Meridian 1 DPNSS1 network.

The controlling party may use a 500/2500 set, M1000 series set, or Meridian feature telephone. On a 500/2500 set or M1000 series set, an inquiry call may be initiated by pressing the Recall key or performing a switch-hook flash. On a Meridian feature phone, an inquiry call may be initiated by pressing the Transfer or Conference key.

After a call transfer, this feature provides messaging that allows DPNSS1 Route Optimisation service to be invoked, in order to optimize the routing of the call through the DPNSS1 network. Also, user set displays are updated, and applicable DPNSS1 access restrictions are applied. These include:

- restrictions configured as part of the Trunk Barring feature

- Public Switch Telephone Network call barring, configured at the telephone set level
- system restrictions dependent on trunk types (not configurable)

The following access restrictions are not supported:

- Tenant Service restrictions
- Network Class of Service restrictions

This feature handles various types of misoperation when the controlling party attempts to transfer from the held party to the inquired-to party. If the user of a Meridian feature phone presses the Transfer key a second time after having already pressed it once to transfer the call, the action is ignored.

For a 500/2500 set, misoperation may occur if the controlling party attempts to transfer after performing an unsuccessful inquiry call to the third party. The inquiry call may have failed due to the controlling party dialing an incomplete number, the inquiry call still being in the set-up stage, or the inquiry call encountering busy tone, overflow tone, or recorded announcement. The held call, if external, is intercepted to the attendant rather than dropped (the held call is dropped if it is an internal call). However, in the cases of overflow and recorded announcement, if the inquiry call remains connected to the overflow tone or recorded announcement until time out occurs, then the held party is dropped.

Misoperation from a 500/2500 set is also prevented in cases where an inquiry call to the third party is successful, but a transfer connection between the held party and inquired-to party is prevented due to trunk-to-trunk access restriction. If the controlling set hangs up, then the inquiry call is disconnected. If the held call is external, it is recalled to the controlling party. If the held call is internal, it is disconnected.

In cases where a call transfer from a held party to an inquired-to party is successful when it should not have been allowed, the call is forced to disconnect.

Operating parameters

There are no operating parameters associated with this feature.

Feature interactions

Within a mixed ISDN/DPNSS1 environment, all nodes with ISDN links must be equipped with the Network Attendant Service feature.

As part of Multi-party Operation, a control digit (0-9, or an # or *) must be dialed to toggle, disconnect, or conference.

If three-party conference is provided as part of Multi-party Operation, and if MPO is configured as ‘disconnect during consultation connection’, then a held party cannot be transferred directly from an inquiry — the controlling party must first form a three-party conference, and then hang up, in order to connect the held party to the inquired-to party as a simple call.

If six-party conference is configured, up to six parties may be conferenced in. If the controlling party hangs up during the conference, the conference is disconnected *if all remaining parties are trunks.* If at least one of the remaining parties is local, then the conference remains established. If the conference reaches a state where there is connection between a set on the controlling node and two other trunks, and the controlling set disconnects, then it becomes a simple call connection between the two trunks. In a simple call connection, if one of the remaining parties is external, it becomes the originating party and the other becomes the terminating party. If both parties are external, this implies that at least one of the parties is a set. The set then becomes the originating party, and the other party becomes the terminating party.

The held party may be transferred to the inquired-to party over an ISDN/DPNSS1 tandem. DPNSS1 calls may be held by the controlling party in the normal way.

A call transferred to a party that has answered may be route optimized, upon completion of the transfer. A call transferred to a ringing set may be optimized upon answering. A held call at the originating or terminating node may be optimized upon establishing a simple call.

Transfer after inquiry has priority over route optimisation. If a node receives end-to-end messaging indicating ‘transferred’ after sending end-to-end messaging containing ‘route optimisation’, the request for route optimisation is aborted.

Call Forward No Answer may override the DPNSS1 access restrictions placed on transfer after inquiry in the following scenario. An inquiry call is made to a set with Call Forward No Answer active. If a transfer is attempted while the inquired-to set is ringing, messaging is not sent to the controlling node. The DPNSS1 access restrictions are checked between the held party and the forwarding party, and not between the held party and forwarded-to party. If the forwarded-to party answers before the transfer is attempted, or if the call is successfully transferred before it is call-forwarded, then the DPNSS1 access restrictions are properly checked.

Call Join allows a user of an M1000 series or 2000 series set, to conference into an active call, a party waiting on a secondary DN or the Call Waiting key. The call is then treated as a conference. If the controlling set disconnects during the conference, and if transfer is allowed, the remaining parties remain connected. Notification of the transfer is sent via end-to-end messaging.

If an inquiry call is made to a busy set with Call Waiting active, the call is placed in call waiting to the inquired-to set. The controlling party, while receiving ringing, may transfer the call.

If Multi-party Operation is equipped at the controlling node, the controlling party may toggle between the held party and inquired-to party, after the inquired-to party has answered the inquiry call from the controlling party.

Multi-party Operation is a stand-alone feature, and does not support network-wide misoperation. It does allow local misoperation treatment to be configured for call transfer, for external and internal calls. The options that may be configured are ATN (route to attendant), DAR (disconnect after re-ring cycle of 1-15), AAR (route to attendant after re-ring cycle), OVF (overflow tone), DIS (disconnect), or STD (standard operation, which is disconnect for internal and route to attendant for external).

DPNSS1 does not support either the Group Hunt or Group Hunt Queuing features.

Feature packaging

DPNSS1 Extension Three Party Service requires DPNSS1 Network Services (DNWK) package 231.

Feature implementation

LD 10 – To configure the transfer/conference capabilities when Multi-Party Operation is not equipped.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
...		
CLS	(XFD) XFA (C6D) C6A	Call Transfer Denied. This will also deny three-party conference. Call Transfer Allowed. This will also allow three-party conference. Six-Party Conference denied Six-Party Conference allowed

LD 10 – To configure the transfer/conference capabilities when Multi-Party Operation is equipped.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
...		
CLS	(XFD) TSA (C6D) C6A	Call Transfer Denied. This will deny three-party service. Three-Party Service Allowed Six-Party Conference Denied Six Party Conference Allowed

LD 11 – Configure transfer/conference capabilities.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data

...		
KEY	xx TRN xx AO3 xx AO6	Call Transfer key Three-Party Conference key Six-Party Conference key

LD 95 – For Calling Party Name Display data, configure the transfer indication mnemonic displayed on the telephone sets.

Prompt	Response	Description
REQ	NEW CHG	Add new data Change existing data
TYPE	CPND	Calling Party Name Display data block
CUST	xx	Customer number
...		
RESN	YES	Display of Reason for redirecting calls allowed
- XFER	 xxxx (T)	Call Transfer display mnemonic Mnemonic for call transfer display in Network Call Redirection (NCRD). One to four characters are accepted (Default)

LD 15 – Configure the Multi-Party Operation attributes.

Prompt	Response	Description
REQ:	CHG	Change existing data
TYPE:	MPO_DATA	Multi-Party Operations
CUST	xx	Customer number
FMOP	YES	Flexible Misoperation Options

- AOCS	xxx yyy	All Other Cases, xxx is for internal calls and yyy is for external calls When xxx/yyy = ATN, the call will route to attendant When xxx/yyy = DAR, the call will disconnect after re-ring cycle of 1-15 When xxx/yyy = AAR, the call will route to attendant after re-ring cycle When xxx/yyy = OVF, the call will receive overflow tone When xxx/yyy = DIS, the call will disconnect When xxx/yyy = STD, the call will disconnect for internal and route to attendant for external
- RALL	(NO) YES	Deny mandatory recall Allow mandatory recall
- CDTO	2 - (-14)	Control digit timeout, in two second increments
IFLS	(NO) YES	Allow switch-hook flash operation Ignore switch-hook flash operation
MHLD	(NO) YES	No Manual Hold required Manual Hold is required
PCDS	(NO) YES	Deny the programming of Controlled Digits Allow the programming of Controlled Digits
- CNFD	0-(1)-9,#,*	Define the control digit for conference
- TGLD	0-(2)-9,#,*	Define the control digit for toggle
- DISD	0-(3)-9,#,*	Define the control digit for disconnect
CCDO	(NO) YES	Deny transfer after inquiry Allow transfer after inquiry

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Loop Avoidance

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The DPNSS1 Loop Avoidance feature prevents a DPNSS1 call from being looped through a network, due to errors in configuration, by placing a limit on the number of channels that a call may use.

A Loop Avoidance (LA) Supplementary Information String (SIS) has been added in all outgoing Initial Service Request Messages (ISRMs), for each call at the originating PBX. The SIS contains a parameter that sets the limit on the number of DPNSS1 transit nodes that a call may use, as defined in the customer data block (Overlay 15). The maximum value to which this limit may be defined is 25.

At each Meridian 1 transit node, the parameter of the Loop Avoidance Supplementary Information String is decremented by one, and a check is done to see if the limit has been reached. If the limit has not been reached, an Initial Service Request Message is sent along the outward channel to route the call onward. If the limit has been reached, the call is cleared back to the originating node and the originating exchange receives a Clear Request Message (CRM) message. The request message contains a specific clearing reason for Loop Avoidance.

The call is treated as if clearing has occurred due to congestion. If configured, alternative routing using Step Back on Congestion is attempted at the originating end only, if all of the available routes for the call have not been used. If alternative routing using Step Back on Congestion is not available, the treatment that the call receives depends on the originating party.

If the originating party is a non-ISDN trunk, the originating party receives congestion treatment as customer-defined in the customer data block (LD 15). This may be a busy or overflow tone. If the call was routed due to Network Alternate Route Selection (NARS), NARS call blocking intercept treatment is given (either overflow, busy, recorded announcement, or route to attendant). If the originating party is an ISDN trunk, the originating party receives congestion treatment as customer-defined in LD 15 (busy or overflow).

If the originating party is a local set, treatment depends on the customer-defined congestion treatment (either busy or overflow) or NARS call blocking intercept treatment (either overflow, busy, recorded announcement, or route to attendant). If the originating party is a local attendant, busy indication is given. At this point, the DPNSS1 Attendant Camp-on feature may not be used.

If a Meridian 1 transit node receives an Initial Service Request Message that does not contain a Loop Avoidance Supplementary Information String, before the ISRM is sent over a new channel, a Loop Avoidance Supplementary Information String is added to the ISRM. The Loop Avoidance parameter is set to the pre-defined Loop Avoidance limit (as programmed against the TNDM prompt in the Customer Data Block, Overlay 15, less one, to account for the incoming DPNSS1 channel.

The Loop Avoidance Supplementary Information String is ignored at a terminating Meridian 1 node that is not a gateway. If a terminating Meridian 1 node is an DPNSS1 to ISDN gateway, then the call is cleared back if the loop avoidance limit has been reached. If the ISDN Call Connection Limitation (ICCL) feature is equipped, the Loop Avoidance Limit is used to create the ICCL Tandem Threshold Limit.

Operating parameters

The intercept treatment for Network Alternate Route Selection calls that are blocked, configured in LD 15 in response to the INTR prompt, should be the same as for calls receiving Loop Avoidance call-back treatment, configured in LD 15 in response to the CONG prompt.

Feature interactions

Attendant Extended Calls

Calls extended by the attendant across a DPNSS1 trunk contain a Loop Avoidance String, with the value of the loop avoidance parameter being customer-defined in LD 15.

A Loop Avoidance Supplementary Information String is included in an Initial Service Request Message requesting the following:

- Camp-on/Call offer
- Route optimisation call set-up
- DPNSS1 Call Back When Next Used
- DPNSS1 Call Back When Free
- DPNSS1 Redirection
- DPNSS1 Three Party Service enquiry call

Camp On

The DPNSS1 Attendant Camp-on feature may not be used following call failure due to loop avoidance.

Call Back When Free

DPNSS1 Call Back When Free cannot be used from an originating set receiving overflow as a loop avoidance clear-back treatment.

DPNSS1 Diversion

After originating a DPNSS1 call, a Meridian 1 will attempt a new call if a Divert Immediate or Busy Instruction is received in a Number Acknowledgment Message (NAM). If the originating item is ISDN containing a Tandem Count value, this value is used to determine the Loop Avoidance Limit of the new DPNSS1 call; otherwise, the Tandem Count value defined in the Customer Data Block, LD 15, is used.

Step Back On Congestion

The Loop Avoidance Limit configured at an originating DPNSS1 Meridian 1 overrides the Step Back On Congestion configuration at a transit PBX.

Transfer

When a call transfer occurs over DPNSS1 links, the held and enquiry segments of the call must not individually exceed the Loop Avoidance parameter limit for the DPNSS1 channels that are used. On completion of the call transfer, the limit may be exceeded.

Remote Virtual Queuing

Remote Virtual Queuing is not allowed on an ISDN call cleared back due to Tandem Threshold Exceeded.

Call Forward

If an incoming DPNSS1 or ISDN call is call forwarded all calls on busy over a DPNSS1 or ISDN trunk, the Loop Avoidance Limit of the incoming call is used for the forwarded call.

ISDN Call Connection Limitation

If the ISDN Call Connection Limitation (ICCL) feature is equipped, when an ISDN call reaches the terminating Meridian 1 node, it returns the Tandem Threshold count in the ALERT message to the originating node. If an ISDN call encounters a DPNSS1 gateway while being channeled, the complete tandem count is not known since DPNSS1 does not pass this information back to the originating node. Therefore, the ICCL Tandem Threshold count in the ALERT message passed from the DPNSS1 gateway to the originating node is incorrect (the actual value returned is that received at the gateway node, increased by one).

For the outgoing portion of a call, the gateway will use the received value of the Loop Avoidance Supplementary Information String or Tandem Count to adjust the Tandem Count or Loop Avoidance Limit information.

Call Hunt

When an incoming DPNSS1 call to a local station hunts across a DPNSS1 trunk, the Loop Avoidance Limit will be used for the outgoing call to avoid the possibility of a call looping continuously because of the Call Hunt feature.

Feature packaging

DPNSS1 Loop Avoidance requires DPNSS1 Network Services (DNWK) package 231.

Feature implementation

LD 15 – Define the Loop Avoidance Limit for DPNSS1 calls or the Tandem Threshold Limit for ISDN calls.

If ISDN and ISDN SUPP packages are configured

Prompt	Response	Description
REQ:	CHG	Modify existing data base
TYPE:	CDB NET	Customer Data Block Networking Data (Release 21 gate opener)
CUST	0-99	Customer number
OPT	aaa	Options
....		
ISDN	YES	
PNI	1-32700	Private Network Identifier
....		
TNDM	0-(15)-31	The Tandem Threshold Limit for ISDN calls, or the Loop Avoidance Limit for DPNSS1 calls if the DNWK package 231 is equipped

If ISDN and ISDN SUPP packages are not configured, but the DNWK package 231 is equipped.

Note that the ISDN prompt does not appear**.**

Prompt	Response	Description
REQ:	CHG	Modify existing data base

TYPE:	CDB NET	Customer Data Block Networking Data (Release 21 gate opener)
CUST	0-99	Customer number
OPT	aaa	Options
....		
TNDM	0-(15)-25	Loop Avoidance Limit for DPNSS1 calls

LD 15 – Define congestion treatment and NARS/BARS blocking treatment.

Prompt	Response	Description
REQ:	CHG	Modify existing data base
TYPE:	CDB INT	Customer Data Block Networking Data (Release 21 gate opener)
CUST	0-99	Customer number
....		
NBLK		Network blocking treatment. Four entries are required.
	OVF ATN RAN BSY SRC1... SRC8	OVF = overflow treatment; ATN = route to attendant; RAN= recorded announcement; BSY = busy tone SRC = caller is relinked to source queue
	(OVF, OVF, OVF, ATN)	Default entry
CONG	(OVFL) BUSY	Congestion treatment Overflow tone for all trunks busy condition, or Busy tone for all trunks busy condition

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Night Service

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The Digital Private Networking Signaling System No.1 (DPNSS1) Night Service feature introduces the “Diversion via a Different Channel” capability of the DPNSS1 Night Service Supplementary Service. That is, it allows a Meridian 1 to treat a third-party PBX’s request to divert a call queued to an attendant that is in Night Service mode, back to the local attendant queue of the originating DPNSS1 node.

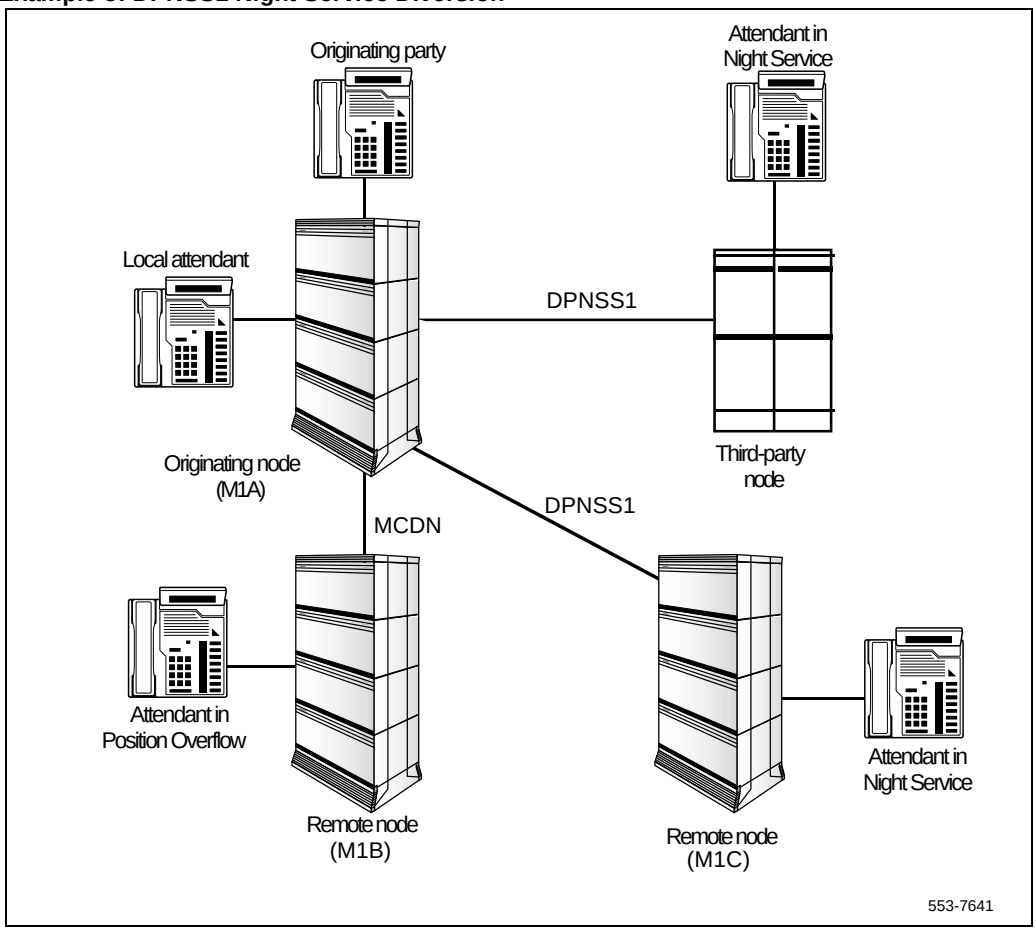
The following example illustrates a DPNSS1 Night Service call processing scenario. Also refer to Figure 3 on page 111.

A DPNSS1 call from the originating Meridian 1 node (M1A) terminates to the attendant on a third-party PBX. The attendant is in Night Service. The third-party PBX signals the Meridian 1 to initiate Night Service Diversion. The call is then diverted back to the originating node, where a new call is initiated to the queue of the local attendant.

> ***Note:*** This diversion is the functionality that has been introduced by the DPNSS1 Night Service feature. The call processing which follows is part of the standard Network Attendant Service (NAS) functionality.

At this point, the call is treated as a standard call to the local attendant. If the local attendant is also in Night Service, Network Attendant Service (NAS) routing is applied. The call is routed to a remote attendant (on M1B.) Since this attendant is in Position Overflow, it cannot take the call and clears it. The next alternative in the NAS routing table is tried, which is for the originating Meridian 1 to route the call to the remote attendant (M1C). Here, the attendant is also in Night Service and clears the call. Eventually, the Night DN is tried successfully. The new call from the originating Meridian 1 to the NIGHT DN is kept, and the old call to the third-party PBX is released.

Figure 3
Example of DPNSS1 Night Service Diversion



Operating parameters

There are no operating parameters associated with this feature.

Feature interactions

DPNSS1 Redirection

A redirected call may undergo Night Service Diversion, if a new call is attempted to an attendant on a third-party PBX that initiates Night Service Diversion.

DPNSS1 Route Optimisation

Route Optimisation is applied if a non-optimum path has been taken by a call answered by either the third-party PBX on which the target operator is located, the local attendant, remote attendant, or the Night DN.

DPNSS1 Step Back on Congestion

If a call to the remote attendant encounters congestion, Step Back on Congestion is initiated and attempted at any node.

DPNSS1 Extension Three Party Service

An enquiry call reaching an attendant in Night Service will undergo Night Service diversion, if available.

Diversion

A diverted call reaching an attendant in Night Service will undergo Night Service diversion, if available.

Attendant Incoming Call Indicators

When a Night Service call is diverted to an attendant, the Incoming Call Indicator is the number of the incoming route (this is the same as for a NAS MCDN call routed to an attendant.)

Call Waiting

If a call is diverted to a third-party operator Night DN that is busy, Call Waiting may be activated (if equipped). The call to the third-party operator PBX is released.

Feature packaging

The following software packages are required for the DPNSS1 Night Service feature:

For basic DPNSS1 network functionality:

- Integrated Digital Access (IDA) package 122
- Digital Private Networking Signaling System No.1 (DPNSS) package 123
- 2.0 Mbps Primary Rate Interface (PRI2) package 154

For enhanced functionality:

- International Supplementary Features (SUPP) package 131
- DPNSS1 Networking Services (DNWK) package 231

For Network Attendant Service interworking:

- Integrated Services Digital Network (ISDN) package 145
- Advanced ISDN Network Services (NTWK) package 148
- Network Attendant Service (NAS) package 159
- ISDN International Features (ISDN INTL SUP) package 166 (to support the MCDN/DPNSS1 gateway with Loop Avoidance)

Feature implementation

LD 15 – Configure the local attendant DN.

Prompt	Response	Description
REQ:	CHG	Change the existing data
TYPE:	ATT	Attendant consoles data
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C
- ATDN	(0)-xxxx(xxx)	Four-digit Attendant Directory Number (up to seven digits with the Directory Number Expansion (DNXP) package 150

LD 15 – Configure the Night Service DN.

Prompt	Response	Description
REQ:	CHG	Change the existing data
TYPE:	NIT	Night Service data
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C
- NIT1	xxxx	First Night Service DN

LD 86 – Define the Remote Attendant data.

Prompt	Response	Description
REQ	NEW, CHG	Add, or Change
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C
FEAT	NAS	Network Attendant Services
TBL	(0)-63	NAS routing table. 0 is the customer routing table; it is also associated with Attendant Console Group 0
...		
ALT	1-7	Attendant Alternative number
ID	x....x	Digits (up to 16) dialed to reach a remote attendant
TODS	1-31	Schedule period to be changed

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 to R2MFC gateway

Contents

This section contains information on the following topics:

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Feature interactions 117
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Feature implementation 120
Feature operation 126

Prior to Release 20, there are a number of countries in Europe, Central America, and South America that require interworking to Other Equipment Manufacturer's PBXs in multivendor networking environments using Digital Private Network Signaling System One (DPNSS1). In these countries, the Central Office protocol is R2 Multifrequency Compelled Signaling (R2MFC) Direct Inward Dialing (DID) and in some cases R2MFC Direct Outward Dialing (DOD). In order for the Meridian 1 to operate in these environments, interworking of DPNSS1 and R2MFC trunks must be provided.

The R2MFC to DPNSS1 Gateway feature provides an interface between R2MFC DID/DOD trunks and DPNSS1 trunks, and can also provide Calling Number Identification (CNI) support for incoming calls.

In addition, the R2MFC to DPNSS1 Gateway feature introduces the following enhancements to the R2MFC incoming CNI request functionalities:

- The ability to request CNI for an incoming R2MFC call is possible immediately after a predetermined number of digits are received. The allowable range for this option is 0 to 7.
- The ability to request CNI for an incoming R2MFC call is possible immediately after an Electronic Switched Network (ESN) code is dialed. The ESN codes recognized for this purpose are Distant Steering Codes (DSC), Trunk Steering Codes (TSC), and NARS/BARS Access Codes (AC1, and AC2).

By using these CNI request options, CNI information will be available before the incoming R2MFC call is routed. This is necessary to provide CNI support for R2MFC DID to DPNSS1 gateway calls, but also provides an alternative for supporting CNI requests for incoming R2MFC calls in general. These options are applicable for incoming R2MFC DID/TIE calls.

Operating parameters

Meridian 1 DPNSS1 networks currently support only Coordinated Dialing Plan (CDP), Special Numbers (SPNs), and Basic Automatic Route Selection (BARS) (for outgoing calls), therefore the R2MFC to DPNSS1 feature does not support Universal Dialing Plans (UDPs).

For R2MFC DID calls routing to DPNSS1 trunks, the option Accept CNI (ACNI) is provided in the DPNSS1 route data block to identify if CNI information should be passed at the gateway. If the ACNI option is set to YES, the far end PBX must accept the Originating Line Identity (OLI) string for Called/Calling Line Category (CLC) Public Switched Telephone Network (PSTN) calls in the Initial Service Request Message (ISRM).

Two additional options are provided for requesting CNI before the R2MFC DID call is even routed as previously described. Using one of these options is the only mechanism that will provide CNI for an R2MFC-DPNSS1 gateway call (unless the call is the result of call redirection). If the interfacing Central Office cannot support such options, both of these options have to be disabled and therefore no CNI will be available for the R2MFC-DPNSS1 gateway call.

CNI is for R2MFC trunks tandeming to DPNSS1 trunks only. For calls originating from DPNSS1 trunks, and tandeming to an outgoing R2MFC trunk, the CNI information in the DPNSS1 call is not used. Existing methods of generating the CNI locally at the gateway node are used.

Interworking of R2MFC TIE trunks and DPNSS1 trunks is not supported for this feature.

Interworking between MFE DID/DOD trunks and DPNSS1 trunks is not supported by this feature. Interworking between MFE KD3 DID/DOD trunks and DPNSS1 trunks is also not supported by this feature.

External Operator Features and Toll Call Identification (from China Number 1 signaling) are not supported by this feature.

No new hardware is required for this feature.

Feature interactions

CDR Calling Line ID for DPNSS1

At the terminating PBX, the OLI string for the R2MFC DID originated call may contain the CNI information. The Release 20 CDR Enhancement feature automatically prints the contents of the OLI string in the CLID field of the CDR. Hence, the CNI information will be made available on the CDR (i.e., it will be printed in the CLID field).

DPNSS1 Basic Call

The R2MFC Gateway feature introduces a change in the content sent in the Initial Service Request Message (ISRM) when the originator of a DPNSS1 call is an R2MFC DID trunk. If CNI information has been obtained from the incoming trunk, the CNI digits are sent as an OLI string in the IRSM. In that case, the Trunk Identity (TID) string is not sent. If no CNI information is available from the originating trunk, the TID string is sent. The transport of the CNI digits as an OLI is controlled by the Accept CNI (ACNI) option on the outgoing DPNSS1 route.

At the terminating node of the DPNSS1 call, an OLI string instead of a TID string may now be received for calls that originate from trunks which are not using ISDN or Integrated Digital Access (IDA) signaling. The information available for call display is now different. If the terminating node cannot handle receiving an OLI from such trunk calls, the ACNI option should be set to NO on the outgoing DPNSS1 route at that gateway.

The Step Back on Congestion (SBOC) option programmed for an outgoing DPNSS1 route is ignored for R2MFC-DPNSS1 gateway calls. Specifically, if an R2MFC DID to DPNSS1 gateway call receives a Clear Request Message (CRM) due to congestion, the call is not rerouted (i.e., does not search for an idle trunk based on the next entry in the Route List Block), regardless of whether or not the SBOC option is programmed. Instead, the call is treated as a congested call and intercept is provided if necessary. If the SBOC option is allowed, there is a potential problem in the gateway signaling because the next outgoing route may not be a DPNSS1 route.

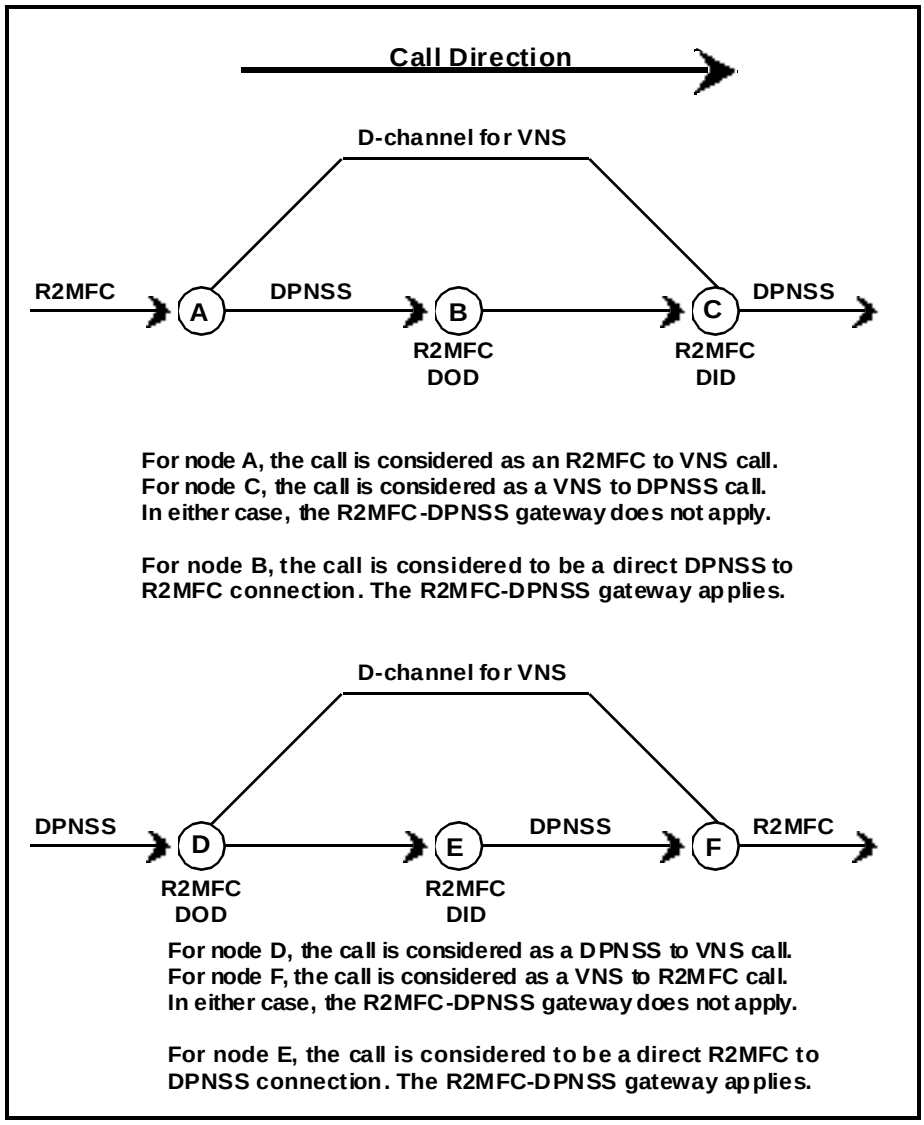
Digital Private Network Signaling System (DPNSS1)/Digital Access Signaling System (DASS2) Uniform Dialing Plan (UDP) Interworking

The R2MFC to DPNSS1 Gateway is supported with UDP numbers at the same level as it is supported with CDP numbers.

Virtual Network Services (VNS)

If the call on the DPNSS1 (or R2MFC) trunk is tandeming to the R2MFC or (DPNSS1) trunk on a Virtual Network Services (VNS) call, the R2MFC to DPNSS1 Gateway feature does not apply. If a DPNSS1/R2MFC tandem is encountered during the routing of a VNS call, the R2MFC to DPNSS1 Gateway feature applies. The following figure illustrates how the R2MFC-DPNSS1 gateway may apply to a VNS call.

Figure 4
Applicability of R2MFC-DPNSS1 Gateway to VNS Calls


Call Direction
D-channel for VNS
R2MFC
A
DPNSS
B
C
DPNSS
R2MFC
DOD
R2MFC
DID
For node A, the call is considered as an R2MFC to VNS call.
For node C, the call is considered as a VNS to DPNSS call.
In either case, the R2MFC-DPNSS gateway does not apply.
For node B, the call is considered to be a direct DPNSS to R2MFC connection. The R2MFC-DPNSS gateway applies.
D-channel for VNS
DPNSS
D
E
DPNSS
F
R2MFC
R2MFC
DOD
R2MFC
DID
For node D, the call is considered as a DPNSS to VNS call.
For node F, the call is considered as a VNS to R2MFC call.
In either case, the R2MFC-DPNSS gateway does not apply.
For node E, the call is considered to be a direct R2MFC to DPNSS connection. The R2MFC-DPNSS gateway applies.

Feature packaging

No new software option package has been introduced with this feature; however, the following packages are required at the gateway Meridian 1 to provide the basic DPNSS1 and R2MFC signaling functionalities:

- Integrated Digital Access (IDA) package 122
- Digital Private Network Signaling System 1 (DPNSS1) package 123
- Multifrequency Compelled Signaling (MFC) package 128

For network numbering the following packages are recommended:

- Coordinated Dialing Plan (CDP) package 59
- Basic Automatic Route Selection (BARS) package 57
- Pretranslation (PXLT) package 92
- Incoming Digit Conversion (IDC) package 113
- Flexible Numbering Plan (FNP) package 160

The CNI request enhancements are packaged under the existing Multifrequency Compelled Signaling (MFC) package 128.

Feature implementation

LD 16 – Configure the R2MFC Call Number Identification for the DPNSS1 route.

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	RDB	Route Data Block
...	...	...
TTBL	...	...
ACNI	YES/(NO)	Accept (do not accept) R2MFC CNI over the DPNSS1 route Prompted if the IDA and MFC packages are equipped, and TKPT = IDA, and SIGL = DPN/APNS

...	...	...
NCNI	(0)-7	Request CNI after the defined number of digits are received If NCNI = 0, the CNI does not depend on the number of digits received If NCNI is defined to be greater than the number of digits required for routing the call, the call is routed without CNI being requested. Prompted if the MFC package is equipped, TKPT = DID or TIE, MFC = R2MF, and the MFC signaling table is defined
CNIE	YES/(NO)	Request (do not request) R2MFC CNI after an ESN code is dialed The ESN code could be a Distant Steering Code, a Trunk Steering Code, the NARS Access Code 1 (AC1) or NARS Access Code 2 (AC2) If NCNI > 0 and CNIE = YES, then CNI is requested when either of the conditions is first met Prompted if the MFC package is equipped, TKPT = DID or TIE, MFC = R2MF, and the MFC signaling table is defined
CNIT	...	...

LD 87 – Define the NCOS groups to which the users will belong.

Prompt	**Response**	**Description**
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	NCTL	Network Control Block
NCOS	0-99	Network Class of Service
FRL	0-7	Facility Restriction Level
RWTA	(NO), YES	Expensive Route Warning Tone

LD 86 – Define the NARS feature parameters (all prompts of the ESN Block are applicable to a DPNSS1 UDP network).

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	ESN	Electronic Switched Network Block
...		
AC1	xx	NARS Access Code 1 (1-4 digits if Flexible Numbering Plan (FNP) package 160 is equipped; otherwise 1-2 digits)
AC2	xx	NARS Access Code 2 (1-4 digits if Flexible Numbering Plan (FNP) package 160 is equipped; otherwise 1-2 digits)

LD 86 – Define the Digit Manipulation tables.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	DGT	Digit Manipulation Table
DMI	x...x	Digit Manipulation Table Index

LD 86 – Define the Route List blocks.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	RLB	Route List Block
RLI	x...x	Route List Index number

ENTR	0-63	Entry number
- ROUT	0-511	Route number associated with the index
...		
- OHQ	NO	On-Hook Queuing is not supported in a DPNSS1 UDP network (ROUT is a DPNSS1 route)
- CBQ	NO	Call Back Queuing is not supported in a DPNSS1 UDP network (ROUT is a DPNSS1 route)

LD 90 – Define the NARS LOC translation table.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	NET	Network Translation Table
TRAN	AC1	NARS Access Code 1 (1-2 digits)
TYPE	LOC	Location Code
LOC	x...x	Location Code (3-7 digits)
FLEN	(0)-10	Flexible number of digits for Location Code (prompted if Flexible Numbering Plan (FNP) package 160 is equipped)
RLI	x...x	Route Line Index

LD 90 – Define the NARS HLOC translation table.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	NET	Network Translation Table

TRAN	AC1	NARS Access Code 1 (1-2 digits)
TYPE	HLOC	Home Location Code
LOC	x...x	Home Location Code (3-7 digits)
DMI	x...x	Digit Manipulation Table Index

LD 16 – Select the DPNSS1 UDP routes.

Prompt	Response	Description
REQ	CHG	Change
TYPE	RDB	Route Data Block
...		
TKTP	IDA	Integrated Digital Access
SIGL	DPN	DPNSS1 signaling on this route
...		
RCLS	...	
- INAC	YES	NARS DPNSS1 UDP route
- SPN	(YES), NO	Insert first the LOC's Access Code to search for a valid UDP number

LD 15 – Configure the Home Location Code (HLOC) in the Customer Data Block to use the UDP digit format on DPNSS1 UDP routes.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	CDB NET	Customer Data Block Networking data (Release 21 gate opener)

...		
HLOC	100-9999	Home Location Code (the HLOC entered here should be the same as that defined in the NET block)

LD 90 – Define SPN numbers.

Prompt	Response	Description
REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer Number
FEAT	NET	Network Translation Tables
TRAN	AC1, AC2, SUM	Access Code 1, 2, or summary tables
TYPE	SPN	Special Number translation code
SPN	xxxx xxxx x..	Special Number translation
RLI	0-999	Route List Index
SDRR	aaa	Type of supplemental restriction or recognition
- DENY	x...x	A number to be denied within the SPN. The maximum number of digits allowed is 10 minus n, where n is the number of digits entered for the prompt SPN. Repeat to deny other numbers.
- ARRN	xxxxx	Alternate Routing Remote Number
- - ARLI	0-999, <CR>	Only output if ARRN is output
- LDID	x...x	Local DID number recognized with the NPA, NXX, or SPN
- DMI	1-255	Digit Manipulation Table Index
- LDDD	x...x	Local DDD number recognized within the NPA, NXX, or SPN
- DID	x...x	Remote DID number recognized within the NPA, NXX, or SPN

- DDD	x...x	Remote DDD number recognized within the NPA, NXX, or SPN
- ITED	x...x	Incoming trunk group exclusion codes for NPA, NXX, or SPN
ITEI		Incoming trunk group exclusion index

LD 16 – Configure a Conventional Main for Off-net recognition.

Prompt	Response	Description
REQ	NEW, CHG	New, or change
TYPE	RDB	Route Data Block
CUST	0-99	Customer Number
TKTP	TIE	TIE trunk
CNVT	(NO), YES	Route to conventional switch (prompted if the response to TKTP is TIE)
DDMI	(0)-255	Digit Manipulation Index (prompted if the response to CNVT is YES)
ATDN	xxxx	Attendant DN of Conventional Main (prompted if the response to CNVT is YES)

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Redirection

Contents

This section contains information on the following topics:

Operating parameters 128
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Feature operation 132

The DPNSS1 Redirection feature allows a DPNSS1 call that is extended by an attendant and not answered after a defined period of time, to be recalled to an attendant. This attendant may be the attendant that originally extended the call, or another attendant on the same or different node within the network.

Note: The DPNSS1 Redirection feature is required for DPNSS1 networks using a Centralized Operator Service, if the network nodes on which operator consoles are located use DPNSS1 Redirection to provide timed operator recall functionality. If operator consoles are located on a Meridian 1 PBX, timed operator recall is provided by the DPNSS1 Timed Recall feature described in this section.

When an attendant extends a call to a destination, and the destination does not answer before the attendant releases the call, information is passed to the originating DPNSS1 node to initiate recall timing. If the information indicates that the destination is free, then the slow answer recall timer is started. If the information indicates that the destination is busy, then the camp-on recall timer is started. For camp-on timing, if the destination party becomes free before the camp-on timer expires, then the destination party receives ringing. The camp-on timer is cancelled, and the slow answer recall timer is started.

If the destination answers the call extension before the recall timer expires, the recall timer is cancelled and the source and destination are connected. If the recall timer expires before the call extension is answered, a new call is initiated to the local attendant. If the local attendant is not available, Network Attendant Service (NAS) routes the call to another node. If the call reaches a state of attendant receiving buzzing, attendant receiving ringing, or queued to attendant, then the originating party is connected to the new call and the original call is dropped.

If a new call cannot be established, a Clear Request Message (CRM) is sent to the originating node and the original call remains connected. If the original call, while in call waiting or camp-on, is answered by the destination party before ringing state is attained, a Call Connected Message (CCM) is sent to the originating node. The new call is cleared and the original call remains connected.

If the original call progresses to ringing before a Number Acknowledgment Message (NAM) is received, the new call is cleared forward and a Call Connected Message (CCM) is sent to the originating node.

Operating parameters

The DPNSS1 Extension Three Party Service must be equipped in order for the Redirection feature to function, since the Redirection feature uses the Three Party Service messaging to perform recall timing.

Special care must be taken when configuring NAS routing for call redirection. If NAS routing is to be used to make the redirected call, a Location Code (LOC) or Distant Steering Code (DSC) must be used and entered in response to the ID prompt in Overlay 86. The digits entered for the ID prompt in must allow the call to be routed immediately, without any

timing. It is strongly suggested that separate DSCs be used for programming the NAS alternatives.

Flexible Numbering must not be used for the configuration of the NAS alternatives. The prompt FLEN should be given a value of “0” in LD 86 for the LOC and in LD 90 for the DSC.

Since there is no system verification during configuration, it is up to the technical personnel to ensure proper programming. If these guidelines are not followed, when the new call is attempted, it will be dropped and the old call retained.

Feature interactions

ISDN/IDA Gateway

The Redirection feature does not apply to calls passing through an DPNSS1/ISDN gateway. If a call comes in from an originating node over an ISDN trunk, passes through a Meridian 1 gateway PBX, is routed to an attendant over a DPNSS1 trunk, and is then extended to a set over a DPNSS1 trunk, then the Redirection feature may only initiate recall timing at the ISDN/DPNSS1 boundary.

The destination party must be within the DPNSS1 or DPNSS1/ISDN network in order for recall timing to be activated at the originating node.

If the destination party to which call waiting or camp-on is applied is on a non-Meridian 1 node, or on a node that does not treat call waiting as does a Meridian 1 node, then it may not be possible to distinguish a call waiting call from a camp-on call. In this case, the call is timed as it were a camp-on call.

If an attendant at one node is established in a call to an attendant at another node, this feature does not apply if the second attendant transfers the call.

Attendant Forward No Answer

If Attendant Forward No Answer is active, a call that has been redirected to an attendant may be passed from one console to another, if the call has been presented but not yet answered. The previous console is placed in night service. If a call is passed to the last console which is service, the call is passed from this console to the night DN.

Call Forward No Answer

If a call is extended from an attendant node that relies on the originating node for recall timing using the Redirection feature, to a ringing set on a Meridian 1 node with Call Forward No Answer (CFNA) active, the recall timing takes precedence over the CFNA timing. When the call is extended to the set, the recall timer is started at the originating node. When the set begins to ring, the CFNA timer is started. If the CFNA timeout is less than the recall timer timeout, then the call is forwarded to the CFNA DN. The CFNA DN is rung until the recall timer expires, at which time the CFNA DN stops ringing and the call is routed to the attendant. If the CFNA timeout is greater than the recall timer timeout, then, when the recall timer expires, the set ceases to ring and the call is routed to the attendant rather than to the CFNA DN.

Call Transfer

Redirection timing is not done at a Meridian 1 DPNSS1 originating node for DPNSS1 calls transferred from sets.

DPNSS1 Loop Avoidance

DPNSS1 Loop Avoidance string (LA) added for a normal call is also added to the redirected call.

DPNSS1 Step Back On Congestion

If a redirected call encounters congestion, the DPNSS1 Step Back on Congestion feature, if active, may cause the call to step back. Another call may be redirected using an alternate, non-congested route.

Initialize

During system initialisation, calls not yet established are dropped.

Splitting

After the Redirection recall timer expires, recalls to the attendant leave only the source active, with the destination being dropped. Therefore, there is no splitting with the Redirection feature.

Slow Answer Recall Modification

The Slow Answer Modification feature may be used in a mixed network environment consisting of attendant nodes that do their own recall timing, and nodes using the Redirection feature for recall timing. This application would result in a more consistent console operation within the network. Where recall timing is done by the attendant node, when a recall occurs to the attendant,

the Slow Answer Modification feature causes the destination to be dropped when the attendant answers the recall. Where recall timing is done by the Redirection feature, when a recall occurs to the attendant, the source remains active while the destination is dropped.

Recall to Same Attendant

After the Redirection recall timer expires, a call extended by an attendant may or may not recall to the attendant that originally extended the call, since the original call is dropped and a new call is originated.

Feature packaging

DPNSS1 Redirection requires DPNSS1 Network Services (DNWK) package 231.

Feature implementation

LD 15 – Define the parameters for recall timers and the attendant DN

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
TYPE:	CDB	Customer Data Block
CUST	xx	Customer number
...		
ATDN	(0) - x..x	Attendant DN. Recalls occur to this DN, upon expiration of the recall timer.
...		

AATT	xxxx	Automatic Identification of Outward Dial Attendant Identifier
RTIM	xxx yyy zzz 0 - (30) - 378 0 - (30) - 510 0 - (30) - 510	Recall Timers xxx = Slow answer recall timer yyy = Camp-on recall timer zzz = Call waiting recall timer Note that for recalls timed at the local node, no distinction is made between call waiting calls and slow answer recalls. The slow answer value is used in both cases.

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Route Optimisation/MCDN Trunk Anti-Tromboning Interworking

Contents

This section contains information on the following topics:

Reference list 133
RO/TAT interworking scenarios 134
Operating parameters 142
Feature interactions 143
Feature packaging 144
Feature implementation 145
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Reference list

The following are the references in this section:

- *Networking Features and Services* (553-2901-301)

The Digital Private Networking Signalling System No.1 (DPNSS1) Route Optimisation (RO)/Meridian Customer Defined Networking (MCDN) Trunk Anti-Tromboning (TAT) Interworking feature provides RO and TAT interworking at DPNSS1/MCDN gateway nodes.

> ***Note:*** For detailed information on the DPNSS1 Route Optimisation feature, please refer to the DPNSS1 Route Optimisation feature description in this document. For detailed information on the Trunk Anti-Tromboning feature, please refer to the *Networking Features and Services* (553-2901-301).

RO/TAT interworking scenarios

RO/TAT interworking within a DPNSS1 to MCDN gateway

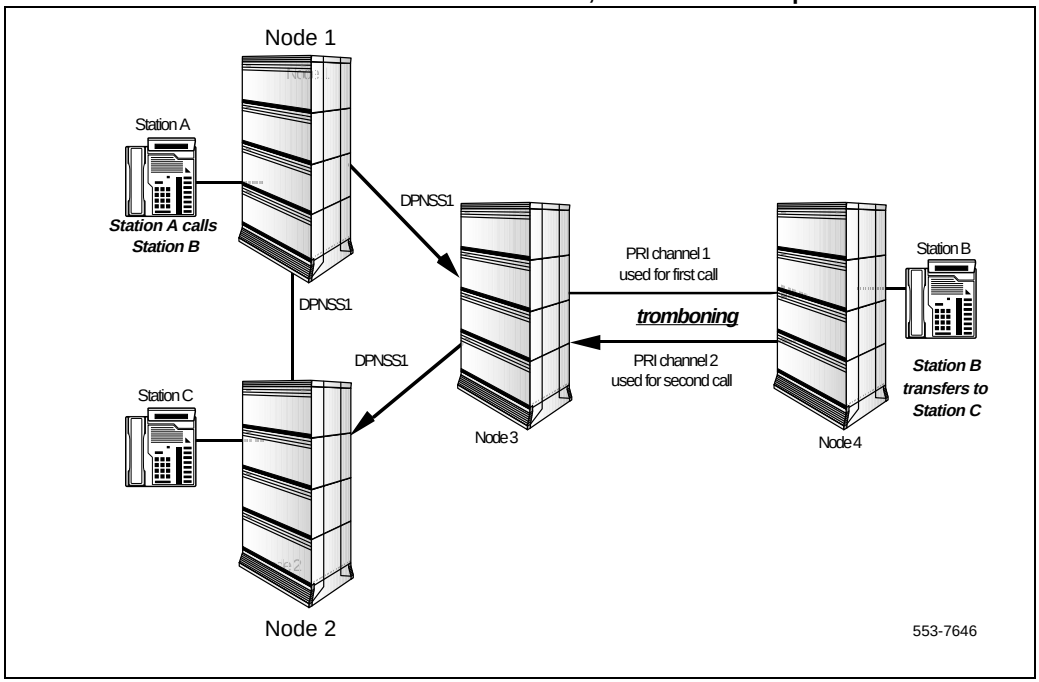
The following example presents a case where RO/TAT interworking occurs within a DPNSS1 to MCDN gateway.

> ***Note:*** In this example, we have used the case where a call has been redirected due to Network Call Transfer. The same functionality would apply if the call had been redirected by Network Call Forward No Answer, and Network Hunting, or modified by Network Call Transfer or Attendant Call Transfer.

Referring to Figure 5 on page 135, Station A, located at Node 1 on the DPNSS1 side of the DPNSS1/MCDN gateway, calls Station B located at Node 4 on the MCDN side of the gateway. It is to be assumed that the optimum DPNSS1 route has been selected at the originating node (the case where a non-optimum route is selected is discussed in the note following Figure 6 on page 136.) Station B activates Network Call Transfer to Station C, located at Node 2 on the DPNSS1 side of the gateway.

Upon activation, the existing call is put on hold and a new call is originated to Station C. Station C Answers. Station B completes the call transfer, leaving A connected to C using two DPNSS1 trunks and two PRI trunks.

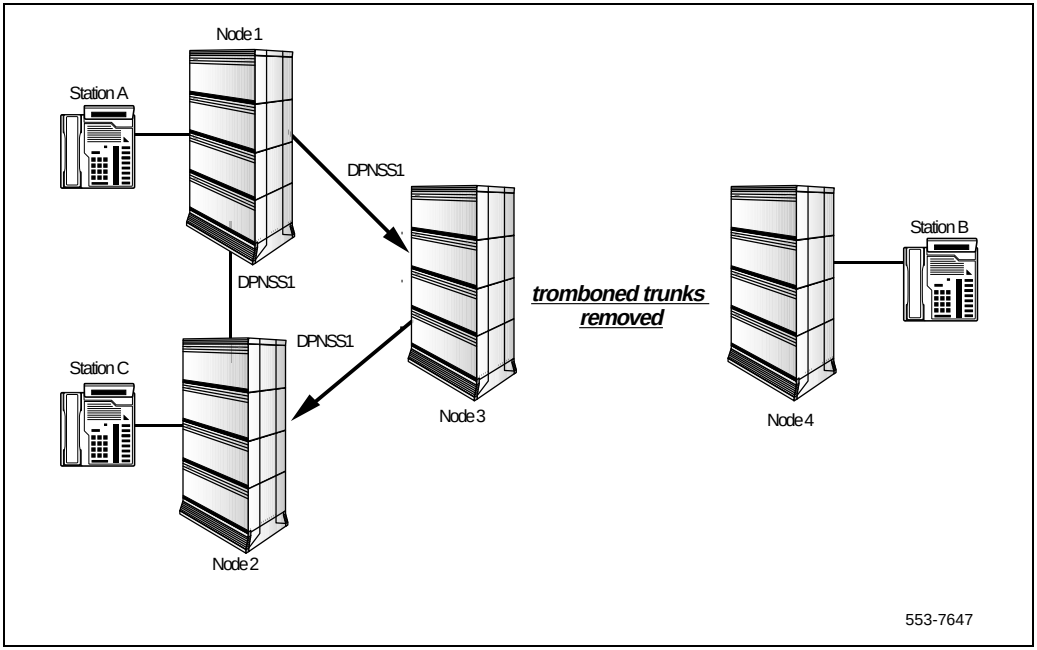
Figure 5
DPNSS1/MCDN scenario with Network Call Transfer, before RO/TAT optimisation



Note: The Network Call Transfer/Three Party Service gateway is not supported at the gateway Node 3. Therefore, RO is not initiated at Node 1, and the non-optimised DPNSS1 trunks remain connected.

On the MCDN side, TAT is initiated at Node 4. The call between A and C is bridged, and the redundant PRI trunks are removed between Node 4 and Node 3. For the meantime, the non-optimised DPNSS1 trunks remain connected, as shown in Figure 6 on page 136.

Figure 6
DPNSS1/MCDN RO/TAT Interworking scenario, after TAT has been applied

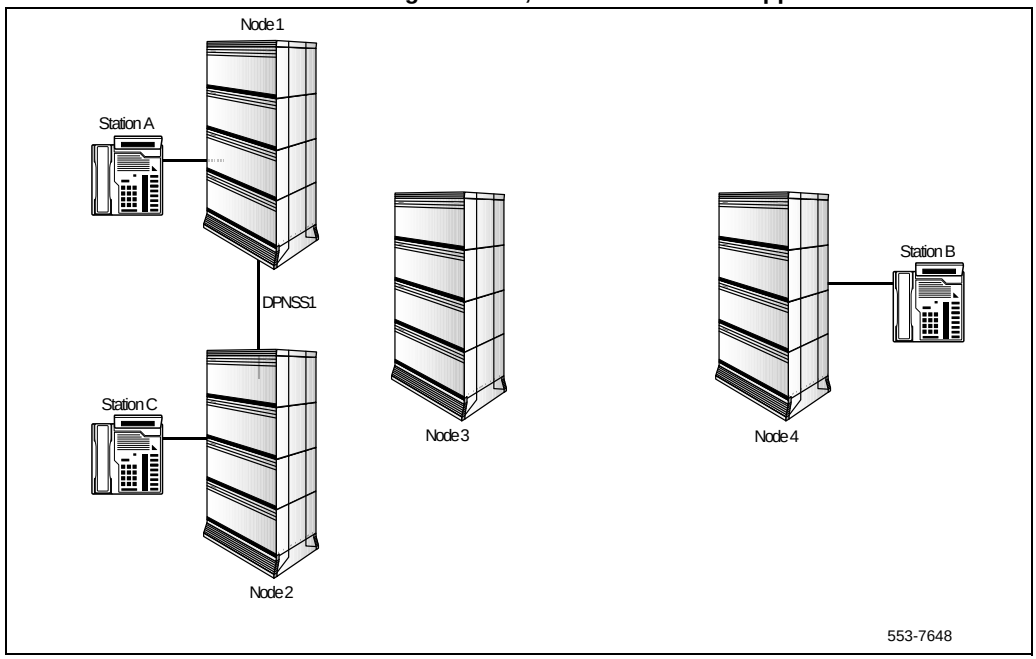


When TAT is completed on the MCDN side, The RO/TAT Interworking feature initiates RO on the DPNSS1 side by simulating a transfer at the gateway Node 3. The Three Party Service feature initiates signaling to update displays. Then, RO is initiated at Node 1, the originating node. The DPNSS1 trunks are dropped between Node 3 and 2 and Node 3 and Node 1, with Station A and Station C being connected over one DPNSS1 trunk. This is shown in Figure 7 on page 137.

Note: If a non-optimum route is used at the originating node or at any transit node, Route Optimisation may start from Node 1 (the normal RO operation for the first call optimisation) or Node 3 (the normal RO operation for the second call optimisation), before TAT is completed. If TAT invocation is received on Node 3 while RO is being applied between Node 1 and Node 3 or Node 3 and Node 2, the completion of TAT is delayed until RO is totally finished.

Upon the completion of TAT on Node 3, a call transfer operation is simulated, and a new RO operation is initiated to remove any potential triangulation of routes.

Figure 7
DPNSS1/MCDN RO/TAT Interworking scenario, after RO has been applied



Note: If Station A is an attendant, TAT takes place on the MCDN side of the gateway but RO cannot take place on the DPNSS1 side. This is a RO limitation.

RO/TAT interworking within a DPNSS1 to MCDN gateway

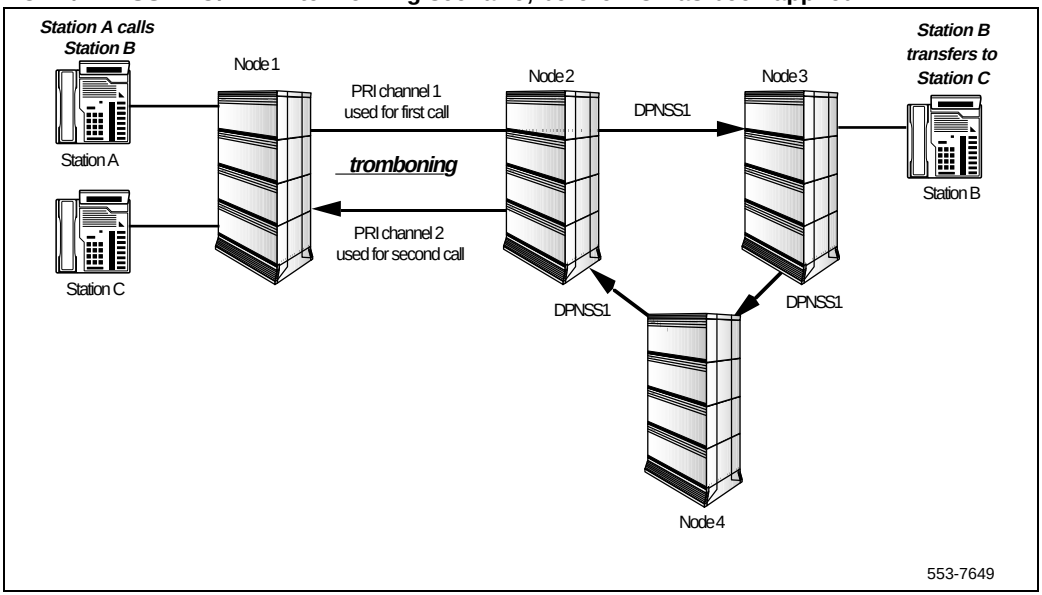
The following example presents a case where RO/TAT interworking occurs within an MCDN to DPNSS1 gateway. Here, too, we are using the case of a call being transferred (using the DPNSS1 Three Party Service feature) across the gateway.

Referring to Figure 8 on page 138, Station A, located at Node 1 on the MCDN side of the MCDN/DPNSS1 gateway, calls Station B located at Node 3 on the DPNSS1 side of the MCDN/DPNSS1 gateway. Station B transfers the call (using the Three Party Service feature) to Station C, also located at Node 1 on the MCDN side of the gateway.

Upon activation, the existing call is put on hold and a new call is originated to Station C.

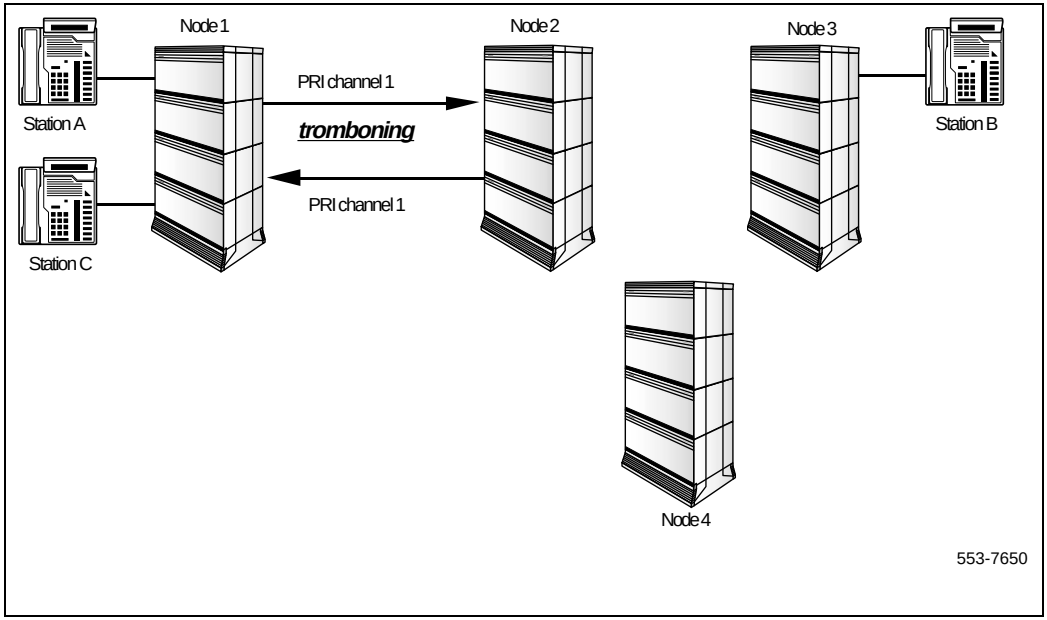
Station C Answers. Station B completes the call transfer, leaving A connected to C using three DPNSS1 trunks (in the example, the call is routed through Node 4) trunks and two PRI trunks.

Figure 8
MCDN/DPNSS1 RO/TAT Interworking scenario, before RO has been applied



Once Three Party Service messaging has taken place, Node 2 initiates RO. The initial DPNSS1 routes are cleared. Node 2 becomes a MCDN/MCDN transit node, and the two tromboning PRI routes between Node 2 and Node 1 remain, as shown in Figure 9 on page 139.

Figure 9
MCDN/DPNSS1 RO/TAT Interworking scenario, after RO has been applied

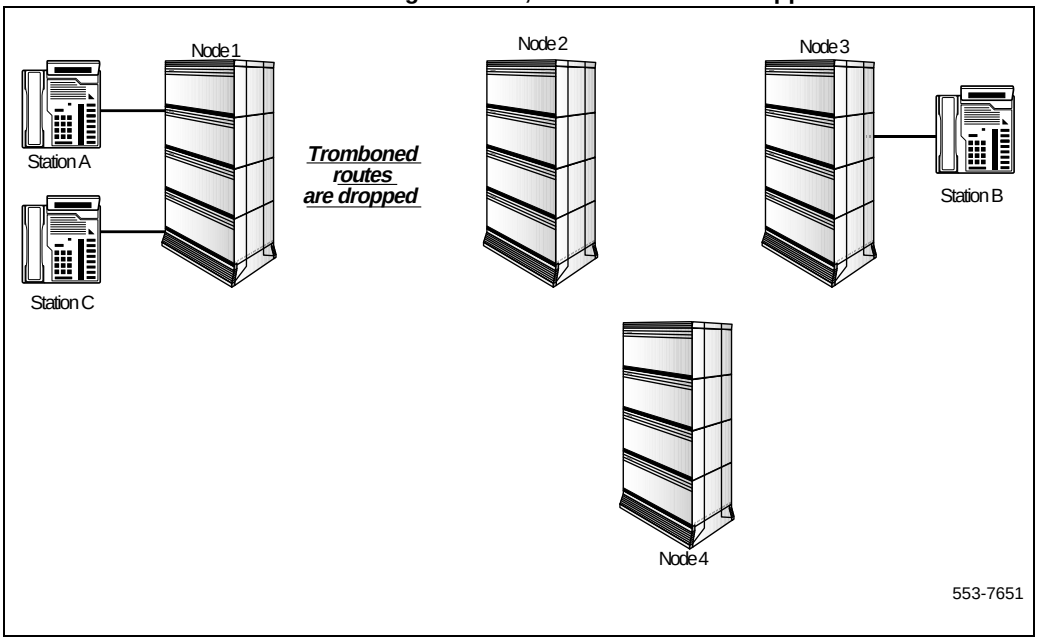


As soon as RO is completed, the RO/TAT initiates TAT at gateway Node 2. After TAT has been completed at Node 1, Node 2 simulates a transfer message to both Station A and Station C. This allows the Network Call Redirection feature to update the displays.

> ***Note:*** If the originating and terminating nodes are one and the same, and if this node is not a tandem node, as is the case for Node 1 in our example, the displays are updated without the notification from the Network Call Redirection feature.

TAT is then completed. The redundant routes are cleared, and Station A and Station C are bridged, as shown in Figure 10 on page 140.

Figure 10
MCDN/DPNSS1 RO/TAT Interworking scenario, after TAT has been applied



Note 1: If Station A is an attendant, and the Network Attendant Service feature is configured, Station B cannot transfer to Station C, and no optimisation can take place. If NAS is not configured, Station B may transfer to Station C, and optimisation takes place as described in this example.

Note 2: In the case of call diversion on the DPNSS1 side (Diversion Immediate, Diversion on Busy, and Diversion on No Reply), there is no interaction with the RO/TAT Interworking feature (the interaction occurs between the Diversion and TAT features.) In the case of tromboning on the DPNSS1 side, the Diversion feature clears the DPNSS1 tromboning trunks before Station C answers the call. When C answers, TAT is applied transparently.

Note 3: Node 1 cannot be a DMS switch for the RO/TAT Interworking feature to operate.

RO/TAT interworking within multiple MCDN/DPNSS1 gateways

A RO/TAT Interworking is supported within a multiple gateway scenario, as illustrated by the following example. Referring to Figure 11 on page 141, Station A on the originating node call Station B across the multiple gateway scenario over PRI and DPNSS1 trunks, as shown below. Station B then transfers to Station C, over different PRI/DPNSS1 trunks. When Station C has completed the call transfer, and Station C answers, TAT is first activated at the far end node, removing the two end PRI trunks. The RO/TAT Interworking feature then activates RO on the DPNSS1 portion of the gateway, removing the DPNSS1 trunks. Then, TAT is activated to remove the last two PRI trunks at the near end of the gateway, leaving Station C and Station A bridged, as shown in Figure 12 on page 141.

Figure 11
RO/TAT Interworking within multiple DPNSS1/MCDN gateways, before RO/TAT

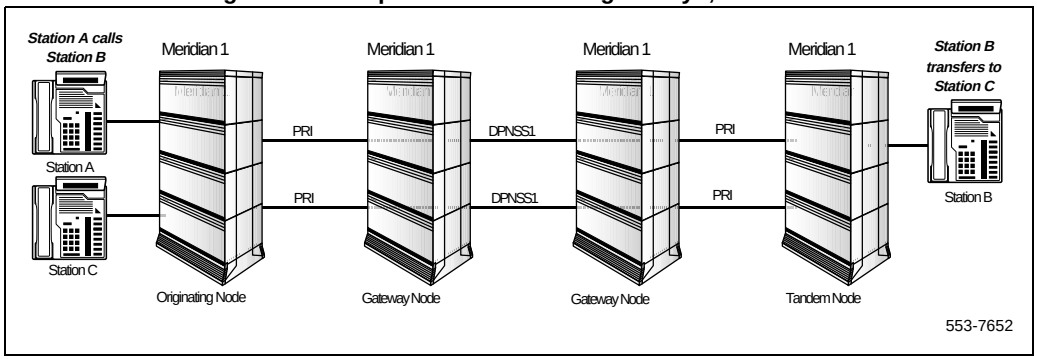
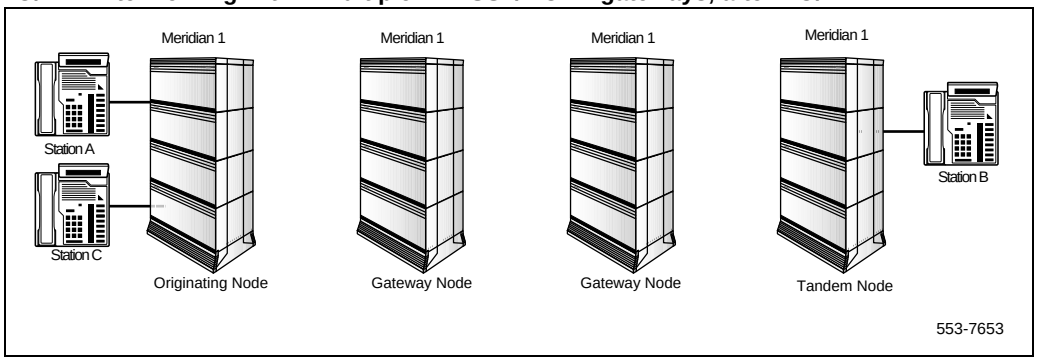


Figure 12
RO/TAT Interworking within multiple DPNSS1/MCDN gateways, after RO/TAT



Abnormal RO/TAT interworking scenarios

The following are possible scenarios whereby the RO/TAT Interworking feature may function abnormally.

- RO fails or is not configured, and TAT is configured.

In the case of a DPNSS1/MCDN gateway, TAT optimises the PRI trunks on the MCDN side, but the DPNSS1 trunks are not optimised on the DPNSS1 side.

In the case of an MCDN/DPNSS1 gateway, RO is not activated and the DPNSS1 side is not optimised. Since the DPNSS1 trunks remain, TAT is not invoked at the gateway node, even though it is equipped. Therefore, if RO is not activated, the RO/TAT Interworking functionality is not invoked.

- TAT fails or is not configured, and RO is configured.

In the case of an MCDN/DPNSS1 gateway, RO optimises the DPNSS1 trunks on the DPNSS1 side, but the MCDN trunks are not optimised on the MCDN side.

In the case of a DPNSS1/MCDN gateway, TAT is not activated on the MCDN side and the tromboning PRI trunks remain. Since the PRI trunks remain, RO is not invoked at the gateway node, even though it is equipped, and DPNSS1 trunks are not optimised on the DPNSS1 side. Therefore, if TAT is not activated, the RO/TAT Interworking functionality is not invoked.

Operating parameters

Although Trunk Anti-Tromboning functions between a Meridian 1 switch and a DMS switch, no TAT messaging is initiated to a DMS switch after Route Optimisation is activated on the DPNSS1 side of an ISDN MCDN/DPNSS1 gateway.

As explained in “Abnormal RO/TAT interworking scenarios” on page 142, both RO and TAT must be activated in order for the RO/TAT Interworking functionality to operate.

The RO/TAT Interworking functionality is only activated after call connection.

RO/TAT Interworking functionality is not applied if the originating party of the first call or the terminating party of the second call is on a conference call.

RO/TAT Interworking functionality is not applied if the originating party of the first call is an attendant.

RO/TAT Interworking functionality is not applied to data calls.

Route Optimisation may be applied to any portion of a DPNSS1 network, as long as both the originating node and terminating nodes are equipped with the RO feature. This is because optimisation is performed by initializing a new call between the originating node and terminating node. However, for the same to apply to Trunk Anti-Tromboning within an MCDN network, every exchange along the network must be equipped with the TAT feature. This is because TAT releases trunks step by step.

Multiple hops across a gateway are supported separately by RO and TAT.

Feature interactions

Multiple Hops

Multiple hops are supported within every RO/TAT Interworking gateway scenario, since they are supported separately by RO and TAT.

Network Attendant Service

If tromboning trunks are removed on the MCDN side of a RO/TAT Interworking gateway scenario by the Network Attendant Service feature (since NAS has precedence over TAT), the RO/TAT Interworking functionality is not invoked. The result is that, if NAS is equipped, attendant-extended calls that are in a tromboning state are optimised on the MCDN side, but DPNSS1 trunks are not optimised on the DPNSS1 side of the RO/TAT Interworking gateway scenario.

Network Call Pickup

If tromboning trunks are removed on the MCDN side of a gateway scenario by the Network Call Pickup feature (since Network Call Pickup has precedence over TAT), TAT is invoked since the Network Call Pickup action is considered as a call forward action. RO/TAT functionality is invoked upon completion of the TAT operation.

Network Call Redirection

If Network Call Redirection is not configured in an DPNSS1/MCDN gateway, the displays are updated normally, since the RO/TAT Interworking feature is not affected.

If Network Call Redirection is not configured in an MCDN/DPNSS1 gateway, the displays are not updated on the bridged sets on the MCDN side. However, if the bridged sets are on the same node, the displays are updated even though NCRD is not configured.

Three Party Service

DPNSS1 Three Party Service is required for every RO/TAT Interworking scenario.

Trunk Route Optimization before Answer

There is no interaction between the Trunk Route Optimization before Answer feature and the RO/TAT Interworking feature, since Trunk Route Optimization before Answer is activated before call completion, and the RO/TAT Interworking functionality is only activated after call connection.

Virtual Network Services

The RO/TAT Interworking feature is not supported over VNS trunks, since VNS uses only MCDN signaling (DPNSS1 is not supported.)

Feature packaging

For the software packages required to support the DPNSS1 Route Optimisation/MCDN Trunk Anti-Tromboning Interworking feature, consult the following publications:

- For DPNSS1 network functionality, please refer to the DPNSS1 Route Optimisation feature description in this document.
- For MCDN Network Attendant Service interworking, consult the *Networking Features and Services* (553-2901-301).

Feature implementation

No new steps are required to configure the DPNSS1 Route Optimisation/MCDN Trunk Anti-Tromboning Interworking feature. However, the following basic configuration must be done.

LD 17 – Configure MCDN Trunk Anti-Tromboning at the far-end switch. TAT is configured on a D-channel basis, and not on a route basis.

Prompt	Response	Description
REQ	CHG	Change existing data
TYPE	ADAN	Type of change
- ADAN		Action Device and Number
	NEW DCH x CHG DCH x	Add D-channel x Change D-channel x
- CTYP		Card type.
	MSDL	MSDL = Multi-purpose Serial Data Link (for Options 51C, 61C, 81, 81C. MSDL = Downloadable D-channel for Option 11
- CDNO	1-10	For Option 11 only The card number for the Downloadable D-channel
- PORT	0-3 1	Port number on MSDL cards Only port 1 is valid for the Option 11
...		
- IFC	SL1 S100 D100 D250	Interface type for D-channel. Either SL1, S100, D100, or D250 may be entered. Currently, SL1 and D250 are the only interfaces supported by TAT.
...		
- RLS	xx	Release ID of the switch at the far end of the D-channel. Release 21 or higher must be entered.

- RCAP	TAT	Remote Capabilities. TAT must be entered to enable Trunk Anti-Tromboning.

LD 15 – Define Route Optimisation.

Prompt	Response	Description
REQ:	CHG	Modify existing data base
TYPE:	CDB NET	Customer Data Block Networking Data (Release 21 gate opener)
CUST	0-99	Customer number
OPT	aaa	Options
....		
ROPT	(NRO) ROA ROX RAX	NRO = inhibit route optimisation ROA = initiate route optimisation only for alternatively routed calls ROX = initiate route optimisation only for calls which have been transferred or attendant-extended RAX = initiate route optimisation only for alternatively routed calls or for calls which have been transferred or attendant-extended

LD 95 – Configure the transfer indication mnemonic displayed on the telephone sets.

Prompt	Response	Description
REQ	NEW CHG	Add new data Change existing data
TYPE	CPND	Calling Party Name Display data block
CUST	xx	Customer number
...		

RESN	YES	Display of Reason for redirecting calls allowed.
- XFER		Call Transfer display mnemonic
	xxxx	Mnemonic for call transfer display in Network Call Redirection (NCRD). One to four characters are accepted.
	(T)	(Default)

LD 15 – To update terminal displays, forward calls to a forwarding DN.

Prompt	Response	Description
REQ:	CHG	Change existing data block
TYPE:	CDB	Customer Data Block
	RDR	Call Redirection data (Release 21 gate opener)
CUST	xx	Customer number
...		
- FNAD	FDN	Call forward no answer DID calls—Flexible CFNA DN
- FNAT	FDN	Treatment for External CFNA calls (non-DID) – when FDN is selected, CFCT handles the call
- FNAL	FDN	Requests treatment for CFNA – when FDN is selected, DID calls are forwarded
...		

LD 16 – To update terminal displays, allow Network Call Redirection.

Prompt	Response	Description
REQ	CHG	Change
TYPE	RDB	Route Data Block
CUST	xx	Customer Number
ROUT	0-511	Route Number

...		
NCNA	(NO) YES	Network Call Name is (is not) allowed
NCRD	(NO) YES	Network Call Redirection. Allows network call redirection messages to be sent (or blocks messages if NCRD= NO) Network Call Redirection can occur without answering YES to the NCRD prompt. This prompt only controls the sending of Network Call Redirection messages, not the actual redirection of the call. The message supplied when NCRD = yes provides the information for the CLID display. When NCRD is NO, the call is redirected without the CLID redirection information. It is appropriate to set NCRD = no when your network interfaces with a network that is equipped with an earlier version of ISDN than Release 14.
TRO	(NO) YES	Trunk Optimization TRO economizes trunk use throughout the network as part of the NCRD feature

LD 95 – To update terminal displays, display the reason calls are redirected.

Prompt	Response	Description
REQ	CHG	Change
TYPE	CPND	Call Party Name Display data block
CUST	xx	Customer number
ROUT	0-511	Route Number
...		
DES	(NO) YES	Designator for Multiple Appearance DNs allowed
RESN	YES	Allow display of reason for redirecting call
CFWD	(F) xxxx	Display mnemonic for (Network) Call Forward All Calls. Default is “F.” Enter the mnemonic that represents NCFAC on a set’s CLID display.

CFNA	(N) xxxx	Mnemonic for (Network) Call Forward No Answer display. Enter the mnemonic that represents NCFNA on a set's CLID display. Default is "N."
HUNT	(B) xxxx	Mnemonic for Network Hunting display
PKUP	(P) xxxx	Mnemonic to allow Call Pickup display
XFER	(T) xxxx	Mnemonic for Call Transfer display

LD 95 – To update terminal displays, give each DN a name.

Prompt	Response	Description
REQ	CHG	Change
TYPE	NAME	Call Party Name Display name entry
CUST	xx	Customer number
DIG	xxx xx	An existing Dial Intercom Group number (0-253) and member number (0-99)
NAME	aaa...a	CPND name using ASCII characters. The DIG prompt is reprompted. Enter <CR> to get the DN prompt.
DN	xxxx	DN of eligible type

LD 10 – To update terminal displays, enable the appropriate feature in the data block.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	500	Enter set type
HUNT	xxxx	Hunt DN for internal calls
FTR	EFD xxx	External Flexible call forward DN

		Only allowed if LD15 is properly configured: FNAD = FDN FNAL = FDN FNAT = FDN If the DNXP package is equipped, up to 7 digits are allowed; otherwise, only 4 digits can be entered. Accepted only if CLS is MWA or FNA.
	EHT xxxx	External Hunt DN Only allowed if CLS = CFTA Same digits defined as above
	FDN xxxxxxx	Flexible Call Forward No Answer DN (cannot be an LDN) Same digits defined as above

LD 11 – To update terminal displays, enable the appropriate feature in the data block.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	xxxx	Enter set type
FDN	x..x	Flexible CFNA DN where xx is the MCDN. The FDN value should include AC1/AC2 when applicable (up to 13 digits).
EFD	xxxx	Network CFNA DN for External calls
HUNT	xxxx	Network Hunt DN for calls with CLS = CFTD
EHT	xxxx	Network Hunt DN for External calls

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1 Route Optimisation

Contents

This section contains information on the following topics:

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Feature interactions 154
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Feature implementation 157
Feature operation 158

The DPNSS1 Route Optimisation feature has been developed to optimise trunk usage within a DPNSS1 network, by replacing non-optimum call paths through a DPNSS1 private network with optimum paths. An optimum path is the path that uses only the first choice routes to link two PBXs across the network. The first choice is determined by the programming of the network numbering and routing at each PBX. This optimisation applies to established simple voice calls which were routed during set-up, or transferred or attendant-extended to another party.

Route optimisation is initiated by the originating PBX, after recognizing that a DPNSS1 call may have been set up over a non-optimum path due to alternative routing or call modification. If the call is ringing, the originating PBX waits for an answer signal before initiating optimisation. If the call has been transferred, on answer, or attendant-extended to a another party, then the transfer or extension signaling sequence initiates the optimisation.

The originating PBX sends a Route Optimisation Request message, which contains a Call Reference Number (CRN) field, to the terminating PBX. The CRN is used as a destination address to route the call back to the originating PBX and uniquely identify the call being optimized (the Originating Line Identity sent in the Initial Service Request Message is used for this purpose). The set-up message for the backward call contains a field that identifies the call set-up as route optimisation. This causes the call, throughout its path, to be restricted to only first choice routes.

If the route optimisation request call set-up successfully gets back to the originating PBX, a conference is established at the originating node between the originating party, the original path still carrying the speech, and the silent new path. A message of acknowledgement is returned to the terminating PBX on the new path. Upon receiving this acknowledgement, the terminating PBX replaces the old path with the new (optimized) path, and sends a connect indication across the new path to the originating PBX. The old path is silenced. Upon receiving the connect indication, the originating PBX terminates the conference, connects the originating party to the optimized path, and clears the original path.

If the route optimisation request call set-up fails, the originating PBX receives a notification message that the route optimisation request was not successful. The originating PBX may then attempt route optimisation again, at 60 second intervals. During this interval, the Meridian 1 may initiate route optimisation requests for other DPNSS1 calls.

A customer may define the following route optimisation options in LD 15, the Customer Data Block:

- NRO (no route optimisation). Route optimisation is inhibited for all calls (this option would typically be used on PBXs having high levels of call traffic).
- ROA (route optimisation for alternatively routed calls). Route optimisation is initiated for calls which have undergone alternative routing. A call is considered to be alternatively routed if it originated over a route which was not the first choice route, or if alternative routing indication is sent in the Routing Information (RTI) of a Network Indication Message (NIM).

- ROX (route optimisation for transferred calls). Route optimisation is initiated for transferred or attended-extended calls.
- RAX (route optimisation for transferred or alternatively routed calls). Route optimisation is initiated for calls which have been alternatively routed, such as by Step Back on Congestion, or for transferred or attended-extended calls.

Operating parameters

While a PBX may response to simultaneous requests for route optimisation, only one call at a time may be optimized from any PBX (this is to prevent ambiguity as to which call is being optimized if a route optimisation request was simultaneously made for two or more calls on the same DN of a multiple appearance DN).

Care must be taken when configuring the incoming and outgoing digit manipulation for the Meridian 1, so that when the insert (INST) digits followed by the Call Reference Number (CRN) are dialed at the terminating PBX, then the call is routed back to the originating PBX.

Some special configuration needs have to be considered for the optimisation of incoming trunk calls. If the Coordinated Dialing Plan (CDP) uses Local Steering Codes (LSCs), then the prompt LSC has to be configured in LD 15. If the CDP uses only Distant Steering Codes (DSCs) as part of the DNs, then a Trunk Steering Code (TSC) has to be configured at each network node, for each network non-DPNSS1 trunk in the network.

For a Coordinated Dialing Plan (CDP) configuration, each steering code (Distant or Trunk) has to be defined, in LD 87, with a Flexible Numbering Plan (FLEN) prompt other than 0 in order to have route optimisation working.

Route optimisation may be applied on a private line, which may cause the private line being removed from a call and replaced by another trunk. This may likely occur when a call is being transferred. It is recommended that a network is not configured to have calls alternatively routed to private lines or alternatively routed after using private lines.

When defining a numbering plan, the insert (INST) digits followed by the Call Reference Number (CRN) should exactly represent the digits to be dialed to reach the DN represented by the Originating Line Identity (OLI) in the Route Optimisation Request message.

Feature interactions

DPNSS1 calls in the ringing state are optimized immediately upon being answered. Transferred calls, on answer, are optimized as soon as the call transfer has been completed.

Route optimisation cannot be applied to the following calls:

- data calls
- conference calls (however, route optimisation may be applied when the conference call reverts to a normal two-party connection)
- calls on hold
- attendant-originated calls
- Single channel working is not supported on Meridian 1

If the conference tone is not switched off on the conference card, the parties involved in the call may hear conference tone during the optimisation sequence.

During a route optimisation attempt, the originating PBX and terminating PBX do not initiate signaling for any other DPNSS1 supplementary service for the call.

During a route optimisation attempt, any key operation from a set involved in the call is ignored, except the release or onhook function. If a set not involved in a call is configured in a single call multiple appearance DN arrangement with a set involved in a route optimisation attempt, then any key operation that interferes with the route optimisation attempt is ignored. Therefore, the set is inhibited from joining the call during the route optimisation attempt.

Analogue Trunks

Route optimisation is only supported on DPNSS1/APNSS trunks. If a call from a non DPNSS1/APNSS trunk comes in to a set within a DPNSS1 network, the call takes the optimum path (if route optimized) from the non DPNSS1/APNSS trunk to the set.

Access Restrictions

Access restrictions placed on sets give them pretranslation, which prevents the sets from dialing certain numbers (a different DN is substituted for the dialed DN). When implementing route optimisation, access restriction must not be set up to substitute a dialed DN with another DN that would prevent optimisation. The terminating PBX must be allowed to originate a call to the originating PBX.

Break-In

Break-in is not allowed during route optimisation, and route optimisation is not allowed during a break-in. After break-in has ended for a call, route optimisation may be applied to the call if it is eligible.

Call Detail Recording

Call Detail Recording (CDR) records are not printed at the originating or terminating PBX, during route optimisation. CDR records are printed at tandem nodes when the non-optimum path is released. The CDR records contain the same information as if the call had occurred on the new path at the time that the original trunks were seized. The cost of the call (that is, the Periodic Pulse Metering information) that has been optimized is the sum of the cost before route optimisation plus the cost after optimisation. The originator of the original call is shown as the originator of the new call, at the originating PBX. The terminator of the call is shown as the terminator of the new call, at the terminating PBX. At transit PBXs, normal information is printed, showing original tandem connections being released as if for calls being cleared at the time of route optimisation, and new tandem connections being released as if for calls being originated at the time of route optimisation.

If an optimized call does not use any trunks, that is, the originating party and terminating party are on the same PBX, then CDR records show the call as being cleared as normal.

Call Forward

A call that has been call-forwarded may be optimized upon being answered only if it has undergone alternative routing. If the forwarded call was not alternatively routed, it may used a non-optimum path.

Hunting

A call that has been picked up or that has undergone hunting may be optimized upon being answered only if it has undergone alternative routing.

Ring Again

A Ring Again new call may be optimized only if it has undergone alternative routing.

Transfer

A call transferred to another party may be optimized only after the call transfer has been completed. A call transferred to a ringing set may be optimized only after being answered.

Step Back On Congestion

A call that has been rerouted due to Step Back on Congestion may be optimized after it is answered.

Group Hunting

During a group hunt, a call to a Pilot DN which has been defined as a trunk access code may be optimized upon being answered only if it has undergone alternative routing.

Camp-On
Call Waiting

A call which is camped-on or call-waiting to a set may not be optimized until the call is answered on the set.

Override

Route optimisation may be applied to a call that is being overridden only after it becomes a simple call.

Initialize

After system initialisation, conference calls are lost. Thus, route optimisation may cause some established calls over non-optimum paths to be lost. Also, after system initialisation, all route optimisation requests are dropped at the PBX where the initialisation has occurred. If the requesting party is not on this PBX, the requesting party is not informed that the request has been dropped.

Pre-Translation

Pretranslation may be used with route optimisation. The stored Call Reference Number (CRN) and the insert (INST) digits are pretranslated by the Initial Service Request Message (ISRM) before being sent, as if being pretranslated after been dialed by terminating party. Similarly, the Destination Address (DA) digits at the terminating PBX are pretranslated as if being dialed by the called party.

Incoming Digit Conversion

Incoming Digit Conversion is not applied to the INST and CNR digits sent in the Route Optimisation call set-up message. This interaction is intended to prevent the CNR digits from being corrupted by Incoming Digit Conversion.

Trunk Barring

It is possible to configure Trunk Barring (TBAR) to prevent trunk-to-trunk connections on a local node. If a trunk call has tromboned over the network to another local trunk, the call will not be optimized if the TBAR configuration restricts the local connection.

Feature packaging

DPNSS1 Route Optimisation requires DPNSS1 Network Services (DNWK) package 231.

Feature implementation

LD 15 – Define Route Optimisation.

Prompt	Response	Description
REQ:	CHG	Modify existing data base
TYPE:	CDB NET	Customer Data Block Networking Data (Release 21 gate opener)
CUST	0-99	Customer number
OPT	aaa	Options

....		
ROPT	(NRO) ROA ROX RAX	NRO = inhibit route optimisation; ROA = initiate route optimisation only for alternatively routed calls; ROX = initiate route optimisation only for calls which have been transferred or attendant-extended; RAX = initiate route optimisation only for alternatively routed calls or for calls which have been transferred or attendant-extended.

Feature operation

No specific operating procedures are required to use this feature.

Standalone Meridian Mail

Contents

This section contains information on the following topics:

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Feature operation 164

The Standalone Meridian Mail feature provides a Meridian Mail system interface to third-party vendors' networks through a DPNSS1 interface. Users on a third-party vendor's exchange can be alerted if messages are waiting and can then access those messages from a remote telephone.

Prior to Release 20, Meridian Mail could not interface to a remote PBX via DPNSS1. With the Standalone Meridian Mail feature, however, it is now possible to exchange messages with a remote DPNSS1 node. Calls to busy sets, calls to sets with call forwarding activated, or calls that are not answered can be routed to Meridian Mail across the DPNSS1 link, providing voice mail service. All features present on Meridian Mail can then be used as required.The identity of the calling and called parties is provided in the Calling Line Category (CLC) of the DPNSS1 message sent by the third party vendor's PBX. The Standalone Meridian Mail feature uses this information to access the correct mailbox on the Meridian Mail system.

The Standalone Meridian Mail feature depends on the features supported by DPNSS1 on the user's PBX.

Standalone Meridian Mail introduces the following enhancements:

Automatic Login to Personal Mailbox from User on Third-party PBX

Meridian Mail users can login to the Meridian Mail system from their telephones by pressing the octothorpe (#) key on their telephone.

Busy Notification

When a call is routed from the third-party PBX to Meridian Mail because the called party is on another call, Standalone Meridian Mail informs the caller of this, using a voice message.

Call Answer

Call answer allows access to the correct mailbox for calls that have been diverted to Meridian Mail from the third-party PBX.

Custom System Greeting

This enhancement is provided to inform callers to the third party PBX of the organization they have called (if they are calling in on a DID trunk). This announcement comes before the regular voice greeting.

Dual Personal Greeting

For callers terminating on the Meridian Mail system, this enhancement provides the option of delivering different messages to internal or external users.

Remote Message Notification

With this enhancement, a Message Waiting lamp can be lit on the remote PBX user's telephone to indicate that a Meridian Mail message is waiting for that extension. Currently, this feature is only supported on the Plessey iSDX system.

Operating parameters

Signaling from mail users to Standalone Meridian Mail must be in-band DTMF. Post End-of-Dialing digits cannot be supported by way of DPNSS1 out-of-band signaling. For the Meridian Mail user, in-band DTMF tones are required from the originating party, wherever they originate.

Standalone Meridian Mail allows only the first eight digits received in the Bearer party address to be transported across the DPNSS1 link.

The third-party exchange must be able to allow diversion to a remote switch to allow the recording of messages.

Call Sender (a Meridian Mail feature) is not supported by the Standalone Meridian Mail feature.

No gateway functionality between ISDN and DPNSS1 for Meridian Mail access or message waiting capability is implemented with this feature. Access to Meridian Mail for any mailbox user on a network must be provided via a single signaling system (either Q.931 for a Meridian 1 or DPNSS1 for other PBXs).

No gateway functionality between ISDN and DPNSS1 for DPNSS1 originator diversion is implemented with this feature. Specifically, if a call originates via a DPNSS1 trunk and is redirected via Q.931,then no notification of this diversion is made to the originator. The reverse also applies.

The following hardware is required for Standalone Meridian Mail:

- Meridian Mail module and standard attachments
- third-party PBXs with DPNSS1 (as needed)
- Meridian 1 system with DPNSS1 and Meridian Mail hardware
- Q.931 networking trunks

Feature interactions

DPNSS1

New messaging is introduced for Remote Notification. These virtual messages are sent in order to remotely activate or deactivate the Message Waiting lamp.

New message sequences are introduced for diversion at the originating party.

DPNSS1/DASS2 Uniform Dialing Plan Interworking

The Standalone Meridian Mail feature is not supported in a DPNSS1 Uniform Dialing Plan (UDP) environment.

Feature packaging

DPNSS1 Standalone Meridian Mail requires DPNSS1 Standalone Meridian Mail (SAMM) package 262.

For DPNSS1 interworking, the following packages are required:

- Integrated Digital Access (IDA) package 122
- Digital Private Network Signaling System 1 (DPNSS) package 123

For Meridian Mail, the following packages are required:

- Make Set Busy (MSB) package 17
- Integrated Message Services (IMS) package 35
- Automatic Call Distribution Package B (ACDB) package 40
- Automatic Call Distribution Package A (ACDA) package 45
- Message Waiting Center (MWC) package 46
- Command Status Link (CSL) package 77
- Auxiliary Processor Link (APL) package 109

For remote Meridian Mail operation, the following packages are required:

- Advanced ISDN Network Services (NTWK) package 148
- Network Message Services (NMS) package 175

Feature implementation

LD 74 – Configure the DPNSS1 interface.

Prompt	Response	Description
REQ	NEW CHG	Add new interface Change existing interface
TYPE	DDSL	DPNSS1 Signaling Link
...		

PRIV	(YES) NO	Private Link to another PBX Link to public exchange
- MWIF	 (STD) ISDM	Message Waiting Interface Standard message waiting interface (default) Plessey ISDX switch with remote message notification

LD 15 – Enable Standalone Meridian Mail as part of the Integrated Messaging System.

Prompt	Response	Description
REQ:	NEW CHG	Add new data Change existing data
TYPE:	CDB IMS	Customer Data Block Integrated Messaging System data (Release 21 gate opener)
...		
IMS	YES	Change Integrated Messaging System features NO = Do not change Integrated Messaging System features (default)
- SAMM	YES	Allow Standalone Meridian Mail NO = Do not allow Standalone Meridian Mail (default)

LD 10 – Configure Standalone Meridian Mail on analog (500/2500 type) sets.

Prompt	Response	Description
REQ:	NEW	Add new data
TYPE:	500	Analog (500/2500 type) telephone
...		
CLS	(SMSD) SMSA	Standalone Mail Server Denied (default) Standalone Mail Server Allowed

LD 23 – Define Voice Services ACD queues for Express Messaging and Voice menus.

Prompt	Response	Description
REQ	NEW	Add new data
TYPE	CDN	Control Directory Number data block
CUST	xx	Customer number
CDN	x...x	Control DN At the CDN prompt, enter the DN of the Voice Service. CDN can be up to four digits, or up to seven digits with the DNXP package 150 equipped
...		
DFDN	x...x	Local default ACD-DN At the DFDN prompt, enter the Meridian Mail DN. DFDN can be up to four digits, or up to seven digits with the DNXP package 150 equipped.

Feature operation

Standalone Meridian Mail requires the same operating procedures from a telephone set as Meridian Mail.

DPNSS1 Step Back on Congestion

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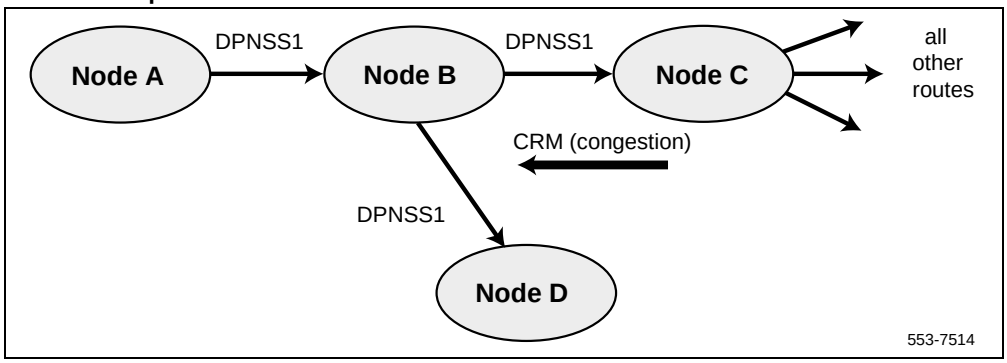
This feature has been developed to handle high traffic situations, when DPNSS1 calls may encounter congestion. If a call over a DPNSS1 network is blocked due to congestion, a Clear Request Message (CRM) is sent back to the preceding node. A transit node or a DPNSS1/ISDN gateway node may receive a CRM with a clearing cause of congestion. An originating node may receive either a CRM containing a clearing cause of congestion, or a CRM containing a clearing cause of Network Termination and a Loop Avoidance Supplementary string. Depending on the SBOC option configured in LD 86, the Electronic Switched Network overlay, the call may be passed back or re-routed using the next free alternative route.

If a CRM with a clearing cause of congestion is received at a transit node, the call may be passed back or re-routed. If a CRM of congestion is received at an DPNSS1/ISDN gateway node, the ISDN Drop Back Busy options, included in the SETUP message according to the Route List Block, are checked to determine whether the call is to be dropped back. If not, the DPNSS1 Step Back on Congestion feature is invoked. If an originating node receives either a CRM containing a clearing cause of congestion, or a CRM containing a clearing cause of Network Termination and a Loop Avoidance Supplementary string. The call may be routed using the next free alternative route, or receive call blocking treatment if no re-routing is configured or if no alternative route is available.

Figure 13
Transit node operation



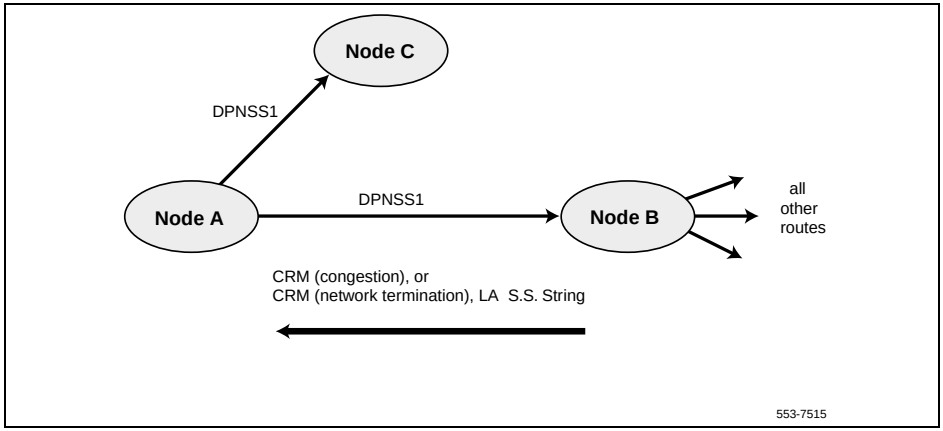
An attempt is being made to establish a call through a DPNSS1 network, from originating node A to terminating node C, via transit node B. All the trunks at node C are busy, so that a CRM with a clearing cause of congestion is sent to the preceding node (node B). At transit node B, alternative 1 is to re-route to node C, and alternative 2 is to re-route to node D.

The SBOC option for node B is checked in LD 86 to determine the treatment. If SBOC = RRA, the next free alternative is tried. If the Class of Service and Network Class of Service access checks are passed, the call is re-routed to the next free alternative, which is node D. A Network Indication Message indicating alternative routing is sent to the preceding node (node A). If there would have been no free alternatives, a CRM of congestion would have been sent back to node A.

If SBOC = NRR or RRO, a CRM of congestion is passed back from transit node B to the preceding node A.

Note: If the call is a route optimisation attempt, there is no attempt made to re-route it — a CRM of congestion is passed back to the preceding node.

Figure 14
Originating node operation



An attempt is being made to establish a call through a DPNSS1 network, from originating node A to terminating node B. All the trunks at node B are busy, so that a CRM with a clearing cause of congestion, or a CRM containing a clearing cause of Network Termination and a Loop Avoidance Supplementary string, is sent to the preceding node (node A).

The SBOC option for node A is checked in LD 86 to determine the treatment. If SBOC = RRA or RRO, the next free alternative (node C) is tried.

If SBOC = NRR, or if no alternatives are available, the network blocking treatment, as defined by prompt NBLK in LD 15, is applied to the call at node A. Note that, for local extensions, if the dialing has not been completed, the provision of busy tone treatment (if defined) is delayed so that digits may be dialed for other features such as Ring Again.

Operating parameters

This feature uses the ESN Coordinated Dialing Plan, or Network Alternate Route Selection (NARS) or Basic Alternate Route Selection (BARS) to re-route a congested call. Re-routing is not attempted if a trunk access code was used to originate the call.

Feature interactions

If a call that has undergone digit manipulation encounters congestion, digit manipulation is re-applied using the originally dialed digits before re-routing is attempted.

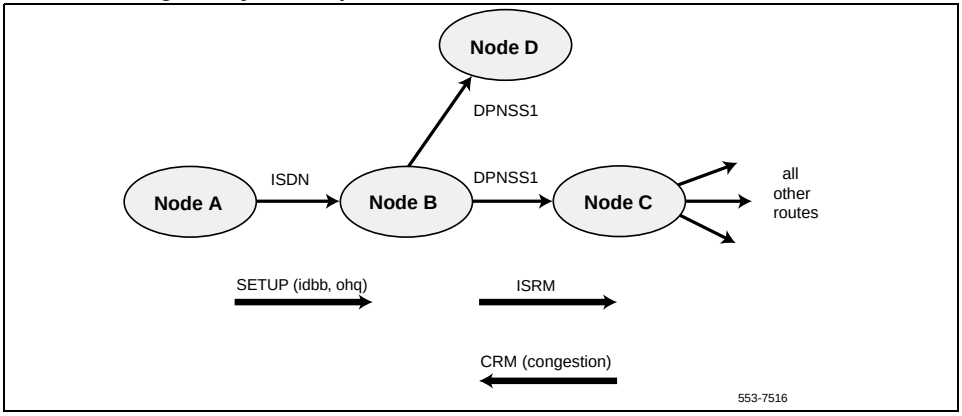
A call that is blocked due to the DPNSS1 Loop Avoidance feature may be re-routed at the originating node, but not at a transit node.

DPNSS1 route optimized calls that encounter congestion are not re-routed, since route optimisation only uses first choice routes.

The intercept treatment applied due to network blocking is customer-defined in LD 15.

DPNSS1/ISDN gateway interworking is illustrated as follows:

Figure 15
ISDN-to-DPNSS1 gateway node operation



An attempt is being made to establish a call through an ISDN-to-DPNSS1 gateway, from originating node A to terminating node C, via gateway node B. When a gateway node (node B) receives a SETUP message, the IDBB and OHQ options are stored. The IDBB option is used to determine which route sets can be used for ISDN Drop Back Busy, and the OHQ option is used to decide if Off Hook Queuing is to be applied at the congested node.

If all the trunks at node C are busy, a CRM with a clearing cause of congestion is sent to the gateway node (node B). At node B, the decision is made whether to apply Drop Back Busy or Off Hook Queuing. If

OHQ = NO

the call is dropped back to the originating node – the SBOC option is not checked. If

OHQ = YES

treatment is applied according to the SBOC option. If

SBOC = RRA

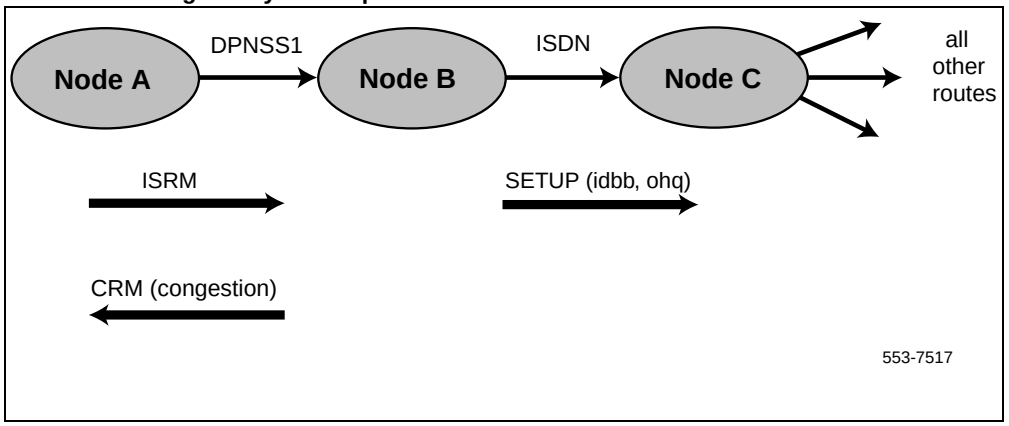
an attempt is made to find a free alternative route, as defined by the IDBB option (if IDBB = DBI, then only I-SET routes may be used to route the call; if IDBB = DBA, then all E-SET routes may be used to route the call). If a free alternative route is found, the call is routed to node D. If no free alternative route is found, the call is dropped back to node A. If

SBOC = RRO or NRR

node B drops the call back to node A by sending a DISCONNECT message with a cause of normal clear.

The following illustrations depict the DPNSS1 Step Back on Congestion functionality as applied to a call trying to be established through a DPNSS1 network at the originating node, at a transit node, at an ISDN-to-DPNSS1 gateway, and at an DPNSS1-to-ISDN gateway.

Figure 16
DPNSS1-to-ISDN gateway node operation



An attempt is being made to establish a call through an DPNSS1-to-ISDN gateway, from originating node A to terminating node C, via gateway node B. In order to provide a consistent interworking between ISDN Drop Back Busy and DPNSS1 Step Back on Congestion, the options for IDBB and OHQ are included at gateway node B in the SETUP message from the outgoing route list block. If all the trunks at node C are busy, and drop back occurs, a DISONNECT message with a cause of normal clear is sent to gateway node B, where it is recognized as a drop back attempt. The DISONNECT message is mapped to a CRM with a reason of congestion, so that Step Back on Congestion is invoked in the DPNSS1 segment of the path.

Feature packaging

DPNSS1 Step Back on Congestion requires DPNSS1 Network Services (DNWK) package 231.

Feature implementation

LD 86 – Define the Step Back on Congestion options.

Prompt	Response	Description
REQ	CHG	Modify existing data base

CUST	0-99	Customer number
FEAT	RLB	Route list data block
RLI	0-999 0-255 0-31 0-127	Route list index (to be accessed for the flexible numbering plan); Route list index to be accessed for NARS; Route list index to be accessed for CDP; Route list index to be accessed for BARS.
ENTR	0-63 0-6	Route list entry number for NARS/BARS Route list entry number for CDP
CNTL	YES/(NO)	YES = change APNSS link parameters NO = use default parameters
ROUT	0-511	Route number
....		
SBOC	 (NRR) RRO RRA	Step Back on Congestion No rerouting Reroute if an originating node, or step back if a transit node
IDBB	 (DBA) DBI	ISDN Drop Back Busy All E-SET routes may be used to route calls Only I-SET routes may be used to route calls

Feature operation

No specific operating procedures are required to use this feature.

DPNSS1/DASS2 Uniform Dialing Plan Interworking

Contents

This section contains information on the following topics:

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Feature operation 188

The Digital Private Network Signaling System (DPNSS1)/Digital Access Signaling System (DASS2) Uniform Dialing Plan (UDP) Interworking feature enables DPNSS1 to use Uniform Dialing Plan numbering. The feature allows DPNSS1 calls to be routed from a switch in one geographical location to another switch in any other geographical location in a cost-effective and easy-to-use manner via the Network Alternate Route Selection (NARS) and Basic Alternate Route Selection (BARS) features.

The following NARS/BARS functions are supported by this development:

- On-network routing over DPNSS1 using a standardized dialing format (Access Code (AC) - Location Code (LOC) - destination DN).
- Off-network routing and break-outs to supported public network interfaces.

- Incoming DASS2 calls routed through the UDP DPNSS1 with NARS if the received digits are in the format AC - LOC or AC-SPN Special Number (SPN) - X...X, or if an Incoming Digit Conversion (IDC) table is applied to generate a number in such a format. In this case, all NARS functionalities supported on DPNSS1 apply to the incoming DASS2 call.
- Least cost route selection by arranging the routes based on relative cost.
- Route control allowing or restricting access to routes based on their restriction level, the time of day, or the dialed sequence.
- Simple calls using UDP numbering across the DPNSS1 Meridian Customer Defined Network (MCDN) gateway, operating with either enbloc or overlap sending and receiving.
- The following DPNSS1 Supplementary Services are supported on UDP DPNSS1 and across the DPNSS1 MCDN gateway:
  - Call Back When Free
  - Call Back When Next Used
  - Executive Intrusion
  - Loop Avoidance
- The following DPNSS1 Supplementary Services are supported on UDP DPNSS1
  - Three-Party
  - Call Offer
  - Redirection
  - Step Back on Congestion
  - Route Optimisation

With DPNSS1, no parameters are exchanged between the switches to indicate whether a Coordinated Dialing Plan (CDP) or UDP number is being sent. To bypass this situation, the MCDN Insert Access Code (INAC) prompt is extended to DPNSS1 on a per route basis to indicate whether the route is dedicated for the reception of UDP numbers, or non-UDP numbers and UDP numbers with a NARS access code.

Operating parameters

The BARS feature by itself (i.e., without NARS) is not supported.

If INAC = YES, an incoming DPNSS1 route only supports UDP numbers with or without the NARS Access Code. If INAC = NO, both non-UDP and UDP numbers are supported providing UDP numbers are appended with the local NARS Access Code.

All HLOCs, LOCs and SPNs NARS codes for a customer must be leftwise unique.

At an originating node, the Traveling Class of Service (TCOS) is not transmitted over DPNSS1. At a receiving node, the Network Class of Service's Facility Restriction Level of the incoming trunk group is used for any further check on access restrictions.

Any number made up of a Route Access Code followed by a DN, received on a route configured with the INAC prompt set to YES, is blocked.

CBWF/CBWNU, Loop Avoidance, Three-Party, Call Offer, Redirection, Step Back on Congestion, Route Optimisation, and Executive Intrusion are the only supported Supplementary Services on a DPNSS1 UDP.

The following hardware is required (minimum vintage):

- DASS2/DPNSS1 D-channel Interface Handler
  - — Standard Mode (0-15 D-channels) – NT5K35AA
  - — Expanded Mode (0-159 D-channels) – NT5K75AA
- 2 Mbps Primary Rate Interface Card – NT8D72AA
- PRI card for MCDN/DPNSS1 – NT6D11AE
- Network Interface Card – QPC414
- Clock Controller Card – QPC775D
- D-channel Handler (for the Option 11).

Feature interactions

Access Restrictions

The connection between the network user (extension or trunk) and the DPNSS1 UDP trunk can be barred based on the Class of Service Restrictions of the parties involved. The connection between the network user (extension or trunk) and the DPNSS1 trunk can also be barred based on the Trunk Group Access Restrictions feature. It is possible to bar the connection between originator and terminator through a DPNSS1 UDP trunk based on the DPNSS1 signaling information.

The Code Restriction sub-feature is not supported.

Attendant Alternate Answering

If an incoming DPNSS1 UDP call presented to an idle loop key of an attendant is not answered within a predefined period of time, the call can be rerouted to the Attendant Alternate DN.

Attendant Interpositional Transfer

This feature is supported in a UDP DPNSS1 network. An attendant can call or transfer a call to another attendant in a multiple-console group, even when the destination Attendant Console is busy.

Attendant Overflow Position

This feature is supported on a UDP DPNSS1 network. If an incoming DPNSS1 UDP call is queued to the attendant, and if the call is not answered within a predefined period of time, the call can be redirected to the Attendant Overflow DN.

Automatic Call Distribution (ACD)

This feature is supported; however, when a call is answered by an agent through a DPNSS1 UDP route, the display on the originator’s set is not updated when the ACD agent answers the call.

Call Detail Recording

This feature is supported in a DPNSS1 UDP network. The following items should be noted:

- If an expensive route (EXP prompt in the Route List Index block) is used to route the call, and if the calling party is allowed the expensive route warning tone (RWTA prompt in Network Control block), the Digit Type Identifier field is “E” in the call record output; otherwise it is “A”.
- If both NARS and BARS packages are equipped in a DPNSS1 UDP network, the Digits field in the call record follows the BARS format. If the Outpulsed Digits feature is used, and OPD = NO, the Route Access Code (ACOD) + the digits dialed after the NARS/BARS Access Code are displayed in the call output record. If the Outpulsed Digits feature is used, and OPD = YES, the Route Access Code + the outpulsed digits are displayed in the call output record.

Call Forward

Calls can be forwarded to and from a DPNSS1 UDP network.

Call Party Name Display

This feature is supported in a DPNSS1 UDP network. Names can be associated with the access codes of the DPNSS1 UDP routes defined in LD 95.

Call Pickup

This feature is supported in a DPNSS1 UDP network.

Custom Call Routing

This feature is not supported in a DPNSS1 UDP network.

Digit Display

The digit display rules for DPNSS1 UDP are based on what is currently done on an MCDN network.

Direct Inward Dialing

This feature is supported in a DPNSS1 UDP network. A connection between a DASS2 DID trunk and a DPNSS1 UDP trunk can be barred using the DITI option in the Customer Data Block.

Direct Inward System Access

This feature is not supported.

DPNSS1 Gateway

The supplementary services supported in a DPNSS1 UDP network are Call Back When Free/Call Back When Next Used, Loop Avoidance, Three-Party, Call Offer, Redirection, and Executive Intrusion.

Electronic Switched Network (ESN)

The DPNSS1/DASS2 Uniform Dialing Plan Interworking feature is a form of ESN routing. The following list describes which ESN functionalities are applicable to a DPNSS1 UDP network.

Alternative Routing for DID/DOD

This feature is supported in a DPNSS1 UDP network.

Basic Alternate Route Selection

The BARS feature alone is not supported.

Coordinated Dialing Plan

Non-UDP and UDP numbers, if they are appended with the NARS access code, received on a route configured with INAC set to NO are now able to terminate, transit, or be sent across the gateway if they are valid.

ESN Signaling (Network Signaling)

The Network Signaling feature is incompatible with DPNSS1 routes.

Eleven Digit Translation

This feature is supported in a DPNSS1 UDP network. Numbers received on an incoming UDP DPNSS1 route can be translated with the existing NARS translator up to 11 digits for route selection.

Flexible Call Back Queuing

This feature is incompatible with DPNSS1 routes.

Flexible ESN 0 Routing

This feature is not supported in a DPNSS1 UDP network.

Flexible Numbering Plan

This feature is supported in a DPNSS1 UDP network.

Free Calling Area Screening
Free Special Number Screening

These features are not supported in a DPNSS1 UDP network.

Incoming Trunk Group Exclusion

This feature is supported in a DPNSS1 UDP network.

Multiple DID Office Code Screening

This feature is not supported in a DPNSS1 UDP network.

NARS Traffic Measurement (Network Traffic Measurement)

This feature is supported in a DPNSS1 UDP network in the following areas:

- Routing Traffic Measurements – provides data related to route list utilization, and
- NCOS Measurements – provides data about the quality of service for a defined NCOS group.

Network Authorization Code

This feature is supported in a DPNSS1 UDP network.

Network Control

This feature is supported in a DPNSS1 UDP network.

Network Routing Control

This feature is supported in a DPNSS1 UDP network.

Network Speed Call

This feature is supported in a DPNSS1 UDP network.

Network Call Transfer

This feature is not applicable to a DPNSS1 UDP network, as it only applies to analog trunks.

Network Queuing (Call Back Queuing)

This feature is incompatible with DPNSS1 routes.

Off-Hook Queuing

This feature is not supported in a DPNSS1 UDP network.

Off-Network Number Recognition

This feature is supported in a DPNSS1 UDP network.

Priority Queuing

This feature is incompatible with DPNSS1 routes.

Special Common Carrier Access

This feature is not supported in a DPNSS1 UDP network.

Tone Detection

This feature is not supported in a DPNSS1 UDP network.

1+ Dialing

This feature is not supported in a DPNSS1 UDP network.

Group Hunting

Only basic DPNSS1 UDP calls are supported with group hunting. Interactions between DPNSS1 Supplementary Services and Group Hunting are not supported.

Incoming DID Digit Conversion (IDC)

An IDC table can be used to convert digits received on a DASS2 DID trunk into a digit string having the UDP format. This allows a DASS2 DID call to access the DPNSS1 UDP network.

Intercept

The NARS blocking treatments that can be defined through the Intercept feature are applicable to a DPNSS1 UDP network.

Intercept Computer

This feature is not supported in a DPNSS1 UDP network.

Interchangeable NPA/NXX

This feature is not supported in a DPNSS1 UDP network.

Meridian Link

This feature is not supported in a DPNSS1-UDP network.

Meridian Mail

This feature is not supported in a DPNSS1 network.

Meridian Mail, Standalone

This feature is supported in a DPNSS1 UDP network.

Network Message Services

This feature is not supported in a DPNSS1 UDP network.

New Flexible Code Restrictions (NFCR)

Toll-denied users (CLS = TLD) may be subject to NFCR if they make a NARS call across the DPNSS1 UDP network. This feature is supported in a DPNSS1 UDP network.

Overlap Signaling

This feature is supported in a DPNSS1 UDP network.

Pretranslation

This feature is supported in a DPNSS1 UDP network.

Recorded Announcement for Calls Diverted to External Trunks

This feature is not supported in a DPNSS1 UDP network.

Route Optimisation

This DPNSS1 feature is supported.

R2MFC to DPNSS1 Gateway

This gateway is supported with UDP numbers at the same level as it is supported with CDP numbers.

Special Dial Tone after Dialed Numbers

This feature is supported in a DPNSS1 UDP network.

Feature packaging

The DPNSS1/DASS2 Uniform Dialing Plan Interworking feature is part of basic system software. The following package is required:

- Network Alternate Route Selection (NARS) package 58.

Basic Alternate Route Selection (BARS) package 57 may also be equipped.

For on-net and off-net routing capabilities, the following package is required:

- Flexible Numbering Plan (FNP) package 160.

If more ESN functions are desired the following packages are required:

- Network Traffic Measurement (NTRF) package 29
- Network Authorization Code (NAUT) package 63
- Basic Authorization Code (BAUT) package 25
- System Speed Call (SSC) package 34
- Network Speed Call (NSCL) package 39
- Directory Number Expansion (DNXP) package 150

If a Group Dialing Plan is to be used, the following package is required:

- Coordinated Dialing Plan (CDP) package 59

If displays are required, the following package must be equipped:

- Digit Display (DDSP) package 19

The following packages are required for DASS2/DPNSS1:

- Integrated Digital Access (IDA) package 122
- Digital Private Network Signaling System 1 (DPNSS) package 123
- Digital Access Signaling System 2 (DASS2) package 124
- International Supplementary Features (SUPP) package 131
- 2.0 Mbps Primary Rate Interface (PRI2) package 154 is a prerequisite.

Feature implementation

LD 87 – Define the NCOS groups to which the users will belong.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number

FEAT	NCTL	Network Control Block
NCOS	0-99	Network Class of Service
FRL	0-7	Facility Restriction Level
RWTA	(NO), YES	Expensive Route Warning Tone

LD 86 – Define the NARS feature parameters (all prompts of the ESN Block are applicable to a DPNSS1 UDP network).

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	ESN	Electronic Switched Network Block
...		
AC1	xx	NARS Access Code 1 (1-4 digits if Flexible Numbering Plan (FNP) package 160 is equipped; otherwise 1-2 digits)
AC2	xx	NARS Access Code 2 (1-4 digits if Flexible Numbering Plan (FNP) package 160 is equipped; otherwise 1-2 digits)

LD 86 – Define the Digit Manipulation tables.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	DGT	Digit Manipulation Table
DMI	x...x	Digit Manipulation Table Index

LD 86 – Define the Route List blocks.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	RLB	Route List Block
RLI	x...x	Route List Index number
ENTR	0-63	Entry number
- ROUT	0-511	Route number associated with the index
...		
- OHQ	NO	On-Hook Queuing is not supported in a DPNSS1 UDP network (ROUT is a DPNSS1 route)
- CBQ	NO	Call Back Queuing is not supported in a DPNSS1 UDP network (ROUT is a DPNSS1 route)

LD 90 – Define the NARS LOC translation table.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	NET	Network Translation Table
TRAN	AC1	NARS Access Code 1 (1-2 digits)
TYPE	LOC	Location Code
LOC	x...x	Location Code (3-7 digits)

FLEN	(0)-10	Flexible number of digits for Location Code (prompted if Flexible Numbering Plan (FNP) package 160 is equipped)
RLI	x...x	Route Line Index

LD 90 – Define the NARS HLOC translation table.

Prompt	Response	Description
REQ	NEW	New
CUST	0-99	Customer Number
FEAT	NET	Network Translation Table
TRAN	AC1	NARS Access Code 1 (1-2 digits)
TYPE	HLOC	Home Location Code
LOC	x...x	Home Location Code (3-7 digits)
DMI	x...x	Digit Manipulation Table Index

LD 16 – Select the DPNSS1 UDP routes.

Prompt	Response	Description
REQ	CHG	Change
TYPE	RDB	Route Data Block
...		
TKTP	IDA	Integrated Digital Access
SIGL	DPN	DPNSS1 signaling on this route
...		
RCLS	...	

- INAC	YES	NARS DPNSS1 UDP route
- SPN	(YES), NO	Insert first the LOC's Access Code to search for a valid UDP number

LD 15 – Configure the Home Location Code (HLOC) in the Customer Data Block to use the UDP digit format on DPNSS1 UDP routes.

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	CDB NET	Customer Data Block Networking data (Release 21 gate opener)
...		
HLOC	100-9999	Home Location Code (the HLOC entered here should be the same as that defined in the NET block)

LD 90 – Define SPN numbers.

Prompt	Response	Description
REQ	NEW, CHG, OUT	Create, change, or remove data.
CUST	0-99	Customer Number.
FEAT	NET	Network Translation Tables.
TRAN	AC1, AC2, SUM	Access Code 1, 2, or summary tables.
TYPE	SPN	Special Number translation code.
SPN	xxxx xxxx x..	Special Number translation.
RLI	0-999	Route List Index.
SDRR	aaa	Type of supplemental restriction or recognition.

- DENY	x...x	A number to be denied within the SPN. The maximum number of digits allowed is 10 minus n, where n is the number of digits entered for the prompt SPN. Repeat to deny other numbers.
- ARRN	xxxxx	Alternate Routing Remote Number.
- - ARLI	0-999, <CR>	Only output if ARRN is output.
- LDID	x...x	Local DID number recognized with the NPA, NXX, or SPN.
- DMI	1-255	Digit Manipulation Table Index.
- LDDD	x...x	Local DDD number recognized within the NPA, NXX, or SPN.
- DID	x...x	Remote DID number recognized within the NPA, NXX, or SPN.
- DDD	x...x	Remote DDD number recognized within the NPA, NXX, or SPN.
- ITED	x...x	Incoming trunk group exclusion codes for NPA, NXX, or SPN.
ITEI		Incoming trunk group exclusion index.

LD 16 – Configure a Conventional Main for Off-net recognition.

Prompt	Response	Description
REQ	NEW, CHG	New, or change.
TYPE	RDB	Route Data Block.
CUST	0-99	Customer Number.
TKTP	TIE	TIE trunk.
CNVT	(NO), YES	Route to conventional switch (prompted if the response to TKTP is TIE).

DDMI	(0)-255	Digit Manipulation Index (prompted if the response to CNVT is YES).
ATDN	xxxx	Attendant DN of Conventional Main (prompted if the response to CNVT is YES).

Feature operation

No specific operating instructions are required to use this feature; however, the following validation algorithm is used by the system.

Validation Algorithm

If a DPNSS1 UDP route is configured with INAC = YES, the following validation algorithm applies, if SPN is set to YES in the Route Data Block:

1 The SPN's NARS Access Code is appended to the received number and a valid NARS code is searched for.

2 If no valid NARS code is found, the appended SPN's NARS Access Code is stripped off and a valid SPN or LOC NARS code is searched for.

3 If no NARS code is found and if the LOC's NARS Access Code differs from the SPN's NARS Access Code, the LOC's NARS Access Code is appended to the received number and a valid LOC code is searched for.

4 If no valid LOC code is found, the appended LOC's NARS Access Code is striped off and the received number is considered invalid, and the call is released. If SPN was set to NO in the Route Data Block a similar validation algorithm applies, except that the LOC's NARS Access Code is appended first in front of the received number.

Virtual Network Services in the UK with DASS2/DPNSS1 Bearers

Contents

This section contains information on the following topics:

Operating parameters 189
Feature interactions 190
Feature packaging 194
Feature implementation 195
Feature operation 199

Virtual Network Services (VNS) provides ISDN features to customers when no ISDN Primary Rate Interface (PRI) or ISDN Signalling Link (ISL) Bearer Channels are available between two Meridian 1 switches (please refer to the VNS feature description module in this NTP for detailed information on VNS).

The Virtual Network Services with DASS2/DPNSS1 Bearers feature introduces VNS in the UK using Digital Private Network Signalling System No.1 (DPNSS1) or Digital Access Signalling System No.2 (DASS2) trunks as VNS Bearer trunks.

Operating parameters

All of the operating parameters that pertain to the Basic VNS feature also apply to the Virtual Network Services with DASS2/DPNSS1 Bearers feature. The following parameters also apply.

Analog Private Networking Signalling System (APNSS) trunks cannot function as VNS Bearer trunks.

No DPNSS1 Supplementary Service is provided when DPNSS1 trunks are used as a VNS Bearer trunk. ISDN features are provided instead. If any of the DPNSS1 Supplementary Service features requires a DPNSS1 route, it cannot use a VNS route.

If ESN is configured, a route list entry with both VNS and DPNSS1 is not chosen.

For DPNSS1/VNS gateway nodes in mixed DASS2/DPNSS1 and VNS networks, the gateway nodes are subject to the same feature support and limitations as the standard DPNSS1/ISDN gateway without VNS. If there is no DPNSS1/ISDN gateway, the feature will be stopped at the DPNSS1/VNS node.

Feature interactions

Analog Private Networking Signalling System (APNSS)

APNSS trunks cannot function as VNS Bearer trunks.

Data calls

Data calls are supported on DPNSS1 or DASS2 VNS Bearer trunks if the DPNSS1 or DASS2 VNS Bearer trunks are configured to support data calls. Similarly, data calls are supported on DPNSS1 or DASS2 Bearer trunks in VNS to DPNNS1/DASS2 gateways, if the DPNSS1 or DASS2 VNS Bearer trunks are configured to support data calls.

DPNSS1 Attendant Call Offer

DPNSS1 Attendant Call Offer is not supported over VNS Bearer trunks (DPNSS1 Attendant Call Offer allows an attendant-extended call, routed over a DPNSS1 trunk, to be camped-on to a remote busy extension.) Standard ISDN Camp-on may be provided instead, if NAS is configured over the VNS Bearer trunks.

DPNSS1 Attendant Timed Reminder Recall and Attendant Three-Party Service

DPNSS1 Attendant Timed Reminder Recall and Attendant Three-Party Service are not supported over VNS Bearer trunks. If NAS is configured over the VNS Bearer trunks, NAS call extension and Attendant Recall will be offered instead.

DPNSS1 Call Back When Free and Call Back When Next Used

DPNSS1 Call Back When Free and Call Back When Next Used are not supported over VNS Bearer trunks. Network Ring Again or Network Ring Again on No Answer may be provided instead, if Network Ring Again or Network Ring Again on No Answer are configured over the VNS Bearer trunks.

DPNSS1 Diversion

DPNSS1 Diversion is not supported over VNS Bearer trunks. Network Call Redirection and Trunk Route Optimization can be provided instead, if configured over the VNS D-channel.

DPNSS1 Extension Three-Party Service

DPNSS1 Extension Three-Party Service is not supported over VNS Bearer trunks. Network Call Redirection and Trunk Route Optimization can be provided instead, if configured over the VNS D-channels.

DPNSS1 Loop Avoidance

DPNSS1 Loop Avoidance is not supported over VNS Bearer trunks (DPNSS1 Loop Avoidance prevents a call from being looped through a DPNSS1 network by placing a limit on the number of channels that a call can use.) The ISDN Call Connection Limitation is provided, if it is configured over the VNS D-channel.

DPNSS1 Route Optimization

DPNSS1 Route Optimization is not supported over VNS Bearer trunks.

DPNSS1 Route Optimization/ISDN Trunk Anti-Tromboning Interworking

ISDN Trunk Anti-Tromboning may be applied to the VNS part of the call, if configured on the VNNS D-channel.

DPNSS1 Step Back On Congestion

DPNSS1 Step Back On Congestion handles high traffic situations when congestion is encountered by DPNSS1 trunks. The following scenarios apply for interworking with VNS.

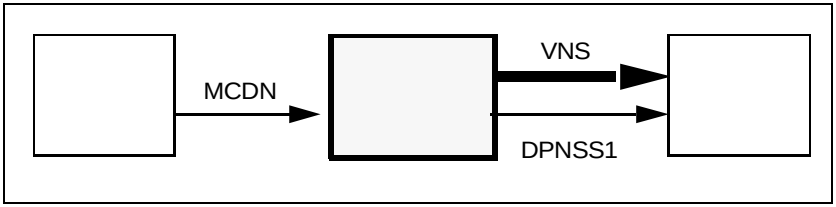
Homogeneous Networks

DPNSS1 Step Back On Congestion is supported over VNS Bearer trunks, if all the transit nodes within the DPNSS1 network used for VNS are configured accordingly:

- In LD 86, if the SBOC (Step Back On Congestion) prompt is set to NRR (No Reroute) or RRO (Reroute Originator), then it would be sufficient that the VNS originating node be configured with either RRO (Reroute Originator) or RRA (Reroute All).
- In LD 86, if the SBOC (Step Back On Congestion) prompt is set to RRA (Reroute All) for a transit node, then the different alternative routes at this node must be configured with VNS and must be configured as VNS Bearers.

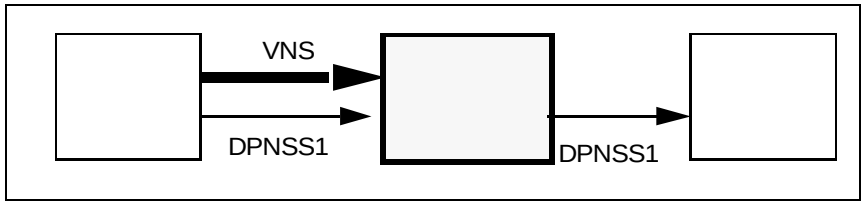
Hybrid Networks

MCDN/VNS with DPNSS1 node



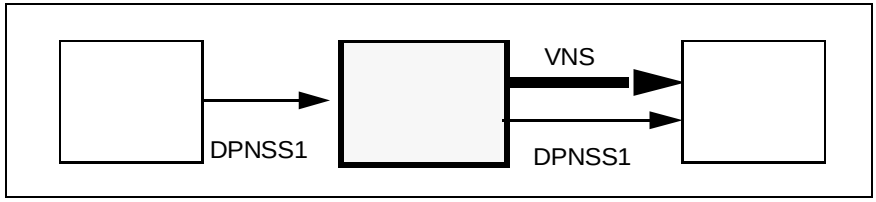
- If a congestion is encountered inside the VNS portion of the path, the node behaves as an MCDN/MCDN tandem. The ISDN Drop Back Busy (IDBB) and ISDN Off-Hook Queuing (IOHQ) are transmitted, so that they may applied further along the VNS portion of the path, or at the tandem node.
- If a congestion is encountered within the DPNSS1 network, the VNS portion of the call is cleared and the disconnection is propagated back to the originating side of the MCDN path. Neither Drop Back Busy nor Off-Hook Queuing is activated at the tandem node, even if IDBB or IOHQ are activated.

VNS with DPNSS1/DPNSS1 node



This scenario is considered as an MCDN/DPNSS1 gateway. The functionality is the same as for the DPNSS1 Step Back on Congestion feature.

DPNSS1/VNS with DPNSS1 node

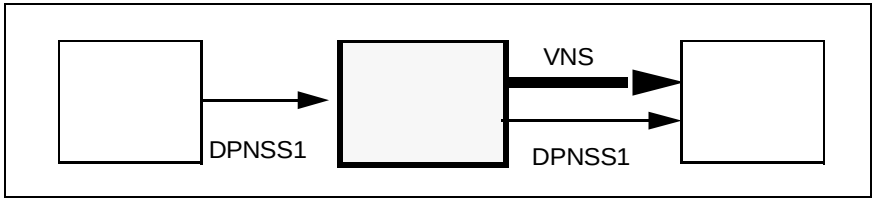


- If a congestion is encountered inside the VNS portion of the path, the VNS portion of the call is cleared and the disconnection is propagated back to the originating DPNSS1 side. The Step Back on Congestion feature is invoked, if it is configured.
- If a congestion is encountered the within the DPNSS1 portion of the path, with the DPNSS1 trunk being used as a VNS Bearer, the VNS portion of the call is cleared and a normal disconnection is propagated back to the originating DPNSS1 side. The Step Back on Congestion feature is not invoked, even if it is configured.
- Refer to “Network Attendant Service (NAS)” on page 194 for information on the interaction with NAS in a similar scenario.

DPNSS1 Executive Intrusion

DPNSS1 Extension Three-Party Service is not supported over VNS Bearer trunks. Attendant Break-in may be provided instead, if NAS is configured over the VNS Bearer trunks.

Network Attendant Service (NAS)



- NAS calls being routed over the DPNSS1 network used as VNS Bearer will get dropped if there is congestion in the bearer call setup. NAS DBK (drop back) will not occur even if it is configured.

Standalone Meridian Mail

Standalone Meridian Mail is not supported over VNS Bearer trunks. A mailbox user may access Meridian Mail, if the ISDN Network Message Services is configured.

DPNSS1 Enhancements for ISDN Interworking

The Release 20B software introduced enhancements to allow DPNSS1 to interwork with QSIG and EuroISDN. At an ISDN gateway, ISDN information may carried into some DPNSS1 messages, if DPNSS_189I package 284 is equipped.

DPNSS1/DASS2 to ISDN PRI Gateway

A VNS call over a DPNSS1 or DASS2 Bearer trunk of an DPNSS1/DASS2 to ISDN PRI Gateway acts as the ISDN leg of the Gateway.

Feature packaging

For total feature functionality, the following packages are required:

- Virtual Network Services (VNS) package 183
- Network Alternative Route Selection (NARS) package 58
- Network Class of Service (NCOS) package 32
- Basic Routing (BRTE) package 14
- Integrated Services Digital Networking (ISDN) package 145
- ISDN Signaling Link (ISL) package 147

- Advanced Network Services (NTWK) package 148
- Integrated Digital Access (IDA) package 122
- 2 MBit Primary Rate Interface (PRI2) package 154
- Digital Private Network Signaling System No.1 (DPNSS) package 123, for routes using DPNSS1 signaling
- Digital Access Signaling System No.2 (DASS2) package 124, for routes using DASS2 signaling

For ISDN to DPNSS1/DASS2 gateway:

- International Supplementary Features (SUPP) package 131
- Network Attendant Service (NAS) package 159

For the Step Back on Congestion Supplementary Service feature:

- DPNSS1 Network Services (DNWK) package 231

The following packages may also be used:

- Universal ISDN Gateway (UIGW) package 283
- ISDN SIS (BTNR-I on DPNSS1), (DPNSS1_189I) package 284

Feature implementation

LD 17 – Configure the VNS D-channel to be associated with the VNS route.
The D-channel should be associated with each node and customer, that is, both ends of the D-channel link should be configured.

Prompt	Response	Description
REQ	CHG, END	Change data, or exit the Overlay
TYPE	ADAN	Action Device and Number
ADAN	CHG DCH 0-63 CHG DCH 0-15	Change the D-channel for Options 51C, 61C, 81, 81C Change the D-channel for Option 11C
USR	VNS, SHAV	VNS=Dedicated D-channel SHAV=Shared D-channel

VNSM	0-300	The maximum number of VNS channels supported by the D-channel This is the potential VNS capability for the D-channel, and is not associated with any other restriction placed on the VNS capability, such as the number of VNS Virtual DNs.
VNSC	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C At least one D-channel must be configured with USR=VNS or USR=SHAV
VNSP	0-32700	Private Network Identifier (PNI) of the far-end customer
VCNA	YES, (NO)	Network Call Party Name Display is (not) available over the D-channel
VCRD	YES, (NO)	Network Call Redirection is (not) available over the D-channel
VTRO	YES, (NO)	Trunk Route optimisation Before Answer is (not) available over the D-channel

LD 96 – Enable the D-channel that has been configured in LD 17.

Prompt	Response	Description
...	ENL DCH 0-63 ENL DCH 0-15	Enable the D-channel 0-63 for Options 51C, 61C, 81, 81C Enable the D-channel 0-15 for Option 11C

LD 79 – Define the VNS DNs for both nodes/customers to be associated with the D-channel configured in LD 17. You may add a new individual VDN to an existing VNS VDN block, or create a new VNS VDN block.

Prompt	Response	Description
REQ	NEW	Add an individual VDN to an Create a new VNS data block
TYPE	VNS	Virtual Network Services

CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C
		At least one D-channel must be configured with USR=VNS or USR=SHAV and having VNS=customer number
VNDN	xxxxxxx 1-4000 xxxxxxx	Individual VDN to be added 1-4000=number of contiguous VDN to be added, xxxxxxx=first VDN to be added
	<cr>	You may add another single VDN by entering <cr> (VDN is prompted until <cr> is entered.)
		For the above entries, the VDNs must be pat of the customer's numbering plan.

LD 16 – Set up the VNS Bearer Trunk.
The Bearer trunk should be associated with each node and customer, that is, both ends of the Bearer link should be configured.

Prompt	Response	Description
REQ	NEW, CHG	Add, or change data
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C At least one D-channel must be configured with USR=VNS or USR=SHAV, in LD 17
ROUT	0-511	The number of the route to be associated with the VNS Bearer Channel
CNTL	YES	Change controls or timers
TIMR	VSS (0),1,2-1023	0=Do not answer the Bearer channel until the terminating party answers 1=Answer the Bearer channel immediately on arrival 2-1023=Answer the Bearer Channel after specified seconds (rounded down to multiple of two seconds) if the terminating party has not already answered
TIMR	VGD 0-(6)-31	Enter the guard timer on the associated VNS DN (the time allowed for the Bearer trunk call to disconnect, in seconds)
VRAT	(NO),YES	(Do not) immediately answer the attendant extended VNS call on the incoming Bearer trunk

LD 86 – Configure the VNS trunk route.

Prompt	Response	Description
REQ	NEW, CHG	Add, or change data
CUST	0-99 0-31	Customer Number for Options 51C, 61C, 81, 81C Customer Number for Option 11C
FEAT	RLB	Route list data block feature

RLI	0-MXRL	The Route List Index to be associated with the VNS Bearer Channel
ENTR	0-63	The entry within the Route List Index to be associated with the VNS Bearer Channel
ROUT	0-511	The number of the Route to be associated with the VNS Bearer Channel
VNS	YES	Virtual Network Services
- VDCH	0-63 0-15	The D-channel used for VNS call for Options 51C, 61C, 81, 81C The D-channel used for VNS call for Option 11C At least one D-channel must be configured with USR=VNS or USR=SHAV, in LD 17
- VDMI		VNS Digit Manipulation Table to be used on the VNS D-channel
	(0) 1-31 1-255 0-999	0=None 1-31=with CDP 1-255=with NARS/BARS 0-999=with Flexible Numbering Plan
-VTRK	1-(20)-100	Number of VNS trunks allowed on the VNS route
...		
DMI		VNS Digit Manipulation Table to be used on the VNS Bearer
	(0) 1-31 1-255 0-999	0=None 1-31=with CDP 1-255=with NARS/BARS 0-999=with Flexible Numbering Plan

Feature operation

No specific operating procedures are required to use this feature.

Configuring an APNSS link

This section describes how to configure basic capabilities for an APNSS link. The procedure explains how to:

- Configure the DCHI and the spare loop for the virtual B-Channel
- Define the D-channel data blocks
- Initialize the service routes to be used in the link
- Initialize the channels within the service routes
- Enable the APNSS link

The steps outlined in Table 5 on page 202 must be followed in sequence. The prompts and responses for these steps are explained in the text that follows. Responses in parentheses are default values throughout the procedure.

Note: Please note the difference in configuration requirements in LD 17 for DPNSS1 systems running on software up to and including Group G, and systems running on software up to and including Group H.

Table 5
Steps for configuring an APNSS link

Step	Overlay	Action
1	LD 17 Configuration Record	**Group G** Configure the APNSS D-channel port number for the NT5K35 DCHI, or the NT5K75 DCHI or NT6D11AE operating in standard mode (only standard mode is allowed for APNSS.) This is the number used to reference the D-channel in Overlay 74; the value is entered against the **DCHI** prompt, and is in the range of 0-15. Configure the unused loop for virtual channels. **Group H** Configure the APNSS D-channel port number, which is a logical port number independent of the actual I/O port address. This is the number used to reference the D-channel in Overlays 74 and 14; the value is entered against the **ADAN** prompt, and is in the range of 0-63. Configure the unused loop for virtual channels
2	LD 74 DDSL Data Block	Define the data blocks used for the APNSS protocols
3	LD 16 Route Data Block	Initialize the service routes to be used
4	LD 14 Trunk Data Block	Initialize the channels within the service routes
5	LD 75 IDA Trunk Maintenance	Enable the APNSS link

LD 17 – Configure the APNSS DCHI, and the unused loop for virtual channels.
Up to and including Group G software

Prompt	Response	Description
REQ	CHG	Change existing data base
TYPE	CFN	Configuration data block
DPNS	YES	Allow next prompt

DCHI	0-15	The D Channel port number
PARM	YES	To allow changes to the system buffers
DTIB	35-1000	To define the number of trunk input buffers for the entire system The system must be initialized to invoke changes to DTIB.
DTOB	4-100	To define the number of trunk output buffers per DCHI The system must be initialized to invoke changes to DTOB.
...		
CEQU	YES	To allow changes to the CE parameters
...		
APVL	0-159	The spare loop number for APNSS Virtual channel The specified loop must be unused; it may be used for more than one APNSS link, as long as different channels are used for each link.

Up to and including Group H software

Prompt	Response	Description
REQ	CHG	Modify existing data base
TYPE	CFN	Configuration data block
ADAN	0-63	The APNSS D-channel port number. This is a logical port number, independent of the hardware I/O addresses. This number is used to reference the D-channel in LD 74.
CTYP	DCHI	Selects the card type as being DCHI
DNUM	0-15	The hardware I/O address of the DCHI. **The switches on the DCHI must be set to correspond to this address.**
DPNS	YES	Allow next prompt
PARM	YES	To allow changes to the system buffers

...		
DTIB	35-1000	Size of IDA trunk input buffers for entire system (determined according to traffic). The system must be initialized to invoke changes to DTIB.
DTOB	4-100	To define the number of IDA trunk output buffers per DCHI (determined according to traffic) The system must be initialized to invoke changes to DTOB.
...		
CEQU	YES	To allow changes to the Common Equipment parameters
...		
APVL	0-159	The spare loop number for APNSS Virtual channel The specified loop must be unused; it may be used for more than one APNSS link, as long as different channels are used for each link.

LD 74 – Define the data blocks used for the APNSS link.

Prompt	Response	Description
REQ	CHG, NEW, OUT, PRT, END	Create new data base, modify existing data base, remove data block, print data block, terminate program activity
TYPE	LSSL	Low Speed Signaling Link, identifies this channel as APNSS
LSSL	 Group G 0-15 Group H 0-63	The D Channel port number, entered in LD 17

RATE	110,150,300, 600,1200,2400, 4800,9600, 19K,56K,64K, (EXT)	Modem clock baud rates. The default is external clocking.
SIDE	AET/BNT	AET or BNT end of APNSS link (an APNSS link must have one end set to AET and the end set to BNT)
CNTL	YES/(NO)	YES = change APNSS link parameters NO = use default parameters
ALRM	TBF PP MM CC FAE PP MM CC HER PP MM CC TSF PP MM CC AIS PP MM CC LOI PP MM CC DAI PP MM CC	Enter the desired persistence time (PP), monitor time (MM), and repeat count threshold (CC) for one of the seven types of alarms The alarm condition thresholds are shown in the table that follows.
CNTR	0- 255 (CRT) (TMT) (SCT)	Only prompted if CNTL = YES. Enter the desired threshold for one of the three counters in the range 0-254. If 255 is entered, the threshold is set to infinity. The defaults are: CRT (channel reset threshold) 120 TMT (test message threshold) 50 SCT (stop count threshold) 20

Table 6
Alarm condition thresholds

Alarm Mnemonic	PP	MM	CC
TBF	0-15 secs (5)	0-24 hrs (0)	0-15 (1)
FAE	0-15 secs (2)	0-24 hrs (1)	0-15 (4)
HER	0-15 mins (1)	0-24 hrs (1)	0-15 (10)
TSF	0-15 secs (0)	0-24 hrs (0)	0-15 (0)
AIS	0-15 mins (1)	0-24 hrs (1)	0-15 (4)
LOI	0-15 secs (0)	0-24 hrs (0)	0-15 (0)
DAI	1-15 mins (1)	0-24 hrs (1)	0-15 (5)

LD 16 – Create the service routes.

Prompt	Response	Description
REQ	CHG, NEW, OUT, PRT, END	Create new data base, modify existing data base, remove data block, print data block, terminate program activity
TYPE	RDB	Route Data Block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	IDA	The trunk type (APNSS)
SIGL	APNS	The route type (APNSS)
....		

ICOG	IAO, ICT, OGT	The route is both ingoing and outgoing The route is ingoing The route is outgoing
ACOD	XX	The four-digit network access code for direct access to the route After the initial set up, the ACOD will only be used for testing purposes.

LD 14 – Initialize the channels within the service routes.

Prompt	Response	Description
REQ	CHG, NEW, OUT, PRT, END	Create new data base, modify existing data base, remove data block, print data block, terminate program activity. NEW and OUT may be followed by the number of channels being initialized (1-30)
TYPE	RAC VAC	Real Analog Channel Virtual Analog Channel
TN	l s c u l u	Analogue Channel Virtual Channel Terminal Number
TOTN	l s c u	Destination TN New loop, shelf, card and unit when telephone data is to be moved to a new TN Not prompted if the response to TYPE was VAC.
CUST	0-99	Customer number
...		
RTMB	0-511 1-256	Route and member number
CHID	1-31	Channel ID for each TN The entry 16 is not allowed.
INC	(YES)/NO	Whether or not the member number is (increased) or decreased with the channel number
PRIO	(XHP) YLP	High priority on channel seizure Low priority on channel seizure The high/low priority must be different at each end.

LD 75 – Bring the APNSS link into service.

Step	Action	Response
1	Enable the DCHI: **ENL DDSL n**	ENBL IDLE (DCHI enabled, but all channels are disabled)
2	Enable the D Channels: **STRT n** Both ends of the link should be started within 5 minutes of each other.	ENBL STARTING (the configured D Channels are being enabled) ENBL ACTIVE (the configured D Channels are enabled)

Traffic monitoring procedures

Please refer to the Nortel Networks technical publication *Traffic Measurement: Formats and Output* (553-2001-450).

Meridian 1 and Succession Communication Server for Enterprise 1000

DPNSS1

Features and Services Guide

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